KCM

KENTUCKY CENTER FOR MATHEMATICS

ANNUAL REPORT

2019

CONTENTS

MISSION, VISION AND GOALS

Mission

This annual report contains highlights of the KCM's statewide work from July 1, 2018 to June 30, 2019. The mission of the KCM is to advance the knowledge and practice of effective mathematics teaching and learning. We provide and develop statewide leadership, facilitate professional learning experiences and cultivate innovation with the aim of improving mathematics education that is grounded in research, centered on practice and focused on learners.

Vision

We envision a world in which everyone is mathematically enlightened and empowered by working with educators throughout the state to evolve and sustain a schoolwide culture of engagement and sense-making.

Goals

- **Leading**- Inform, collaborate and cultivate leadership
- **Learning**- Prepare and develop educators
- **Launching**- Strengthen and advance math education

PROFESSIONAL LEARNING EXPERIENCES

1,096
Hours Provided

1,047
Participants

182
Course Days

The KCM provided 29 different courses in 2018-2019, including 73 unique cohorts. Out of the 1,047 participants, Kentucky was represented in 83 counties, 109 school districts and 297 schools.

A total of 2,929 fluency assessment tests were conducted, which informed 1,022 unique assessments. This total includes 867 students, with 74 teachers utilizing the assessments.

LETTER FROM THE EXECUTIVE DIRECTOR

Kelly Delong,
Executive Director

Dear Kentucky Mathematics Education Stakeholders,

Hop in my car! I am taking you on a trip across Kentucky. I wish you could travel with me for just one day as I visit mathematics classrooms across the Commonwealth. You would be mesmerized by the amazing teachers and their students. Imagine seeing math interventionist, Kim Jones of Jefferson County, surrounded by a group of students so engrossed in exploring place value with math manipulatives they forget to go back to their regular classroom. Oh the joy that fills the room. Or Katie Snodgrass, kindergarten teacher from Franklin County, who leads her students in a robust Number Talk about geometric concepts- all students engaged and eager to share their math reasoning. Perhaps, you could see Jacqulin Damron from Pike County giving awards to students who had great mathematics success as a result of her intervention sessions. The pride in the students' eyes would fill your heart.

Our destination at the Kentucky Center for Mathematics is **excellence**!

Here at the Kentucky Center for Mathematics, we are proud to support and scale high-quality mathematics one classroom at a time. Our research tells the comprehensive story. Kentucky mathematics teachers overwhelmingly believe that KCM professional learning increases knowledge of content, student learning and making connections among mathematical representations to deepen students' understanding of concepts and procedures. High praise from our teachers is exactly the outcome we strive for.

As we continue to cruise ahead, KCM is committed to excellence in mathematics classrooms across Kentucky. We are dedicated to our teachers and their students. My travels document the amazing educators across KY. I'll be back on the road tomorrow. Ride along with me!

Sincerely,

Kelly DeLong

KCM EXECUTIVE DIRECTOR

PRESCHOOL

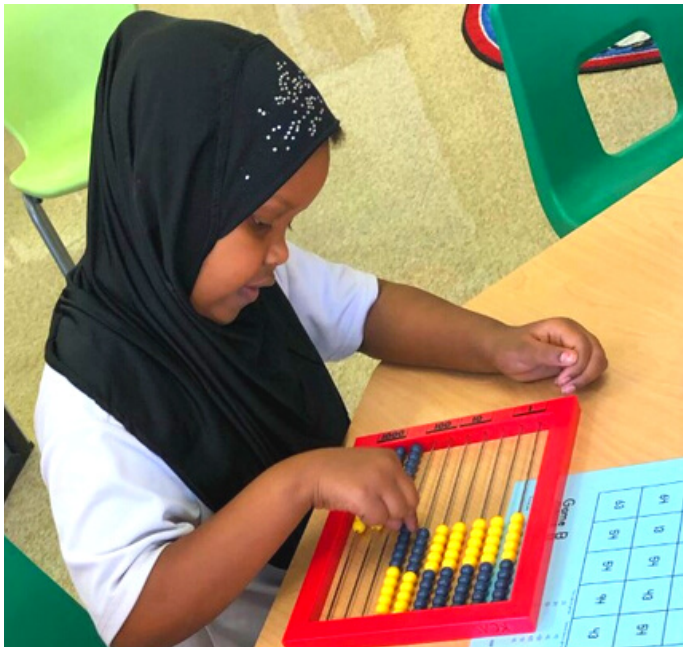
The Foundations for Early Childhood Mathematics professional development featured content developed by the Erikson Institute, leaders in early childhood education. This course, attended by 25 teachers, highlighted the “Big Ideas” in early mathematics which include sets, number sense, counting, number operations, pattern, measurement and shape.

Foundations for Early Childhood

ELEMENTARY

Comprehensive Course for Primary Grades K-2

This eight-day learning opportunity was attended by 134 classroom, special education and mathematics intervention teachers of students in grades K-2. Participants engaged in varied instructional strategies, and acquired tools to assess, support and advance students' mathematical reasoning and knowledge. Topics included counting and cardinality, number and operations, early algebraic reasoning, conceptual place value, measurement and data, and math/literature connections.



Foundations for Primary 2nd & 3rd Grades

This course helped 71 second and third grade teachers grow their understanding of 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. There was a focus on helping students conceptually understand place value, addition/subtraction, multiplication/division and fractions.

Foundations for Intermediate (3-5)

This four day professional learning event was attended by 53 third, fourth and fifth grade teachers. It is aligned to research-based teaching practices and KAS; topics included number, place value, operations (addition, subtraction, multiplication, and division) and early algebraic reasoning.

ELEMENTARY

SNAP (Student Numeracy Assessment Progressions)

The Student Numeracy Assessment Progressions (SNAP) course was offered to 21 K-2 teachers an introduction to the assessment and advancement of early learning of number and arithmetic.

Enhancing Leadership Skills in Teaching Mathematics for P-1

The two-day summer institute and virtual follow-up sessions helped 35 leaders establish productive group norms for ongoing learning. Participants built a repertoire of strategies, while deepening their own understanding of Mathematics Knowledge for Teaching.

Explorations in Student Work Analysis

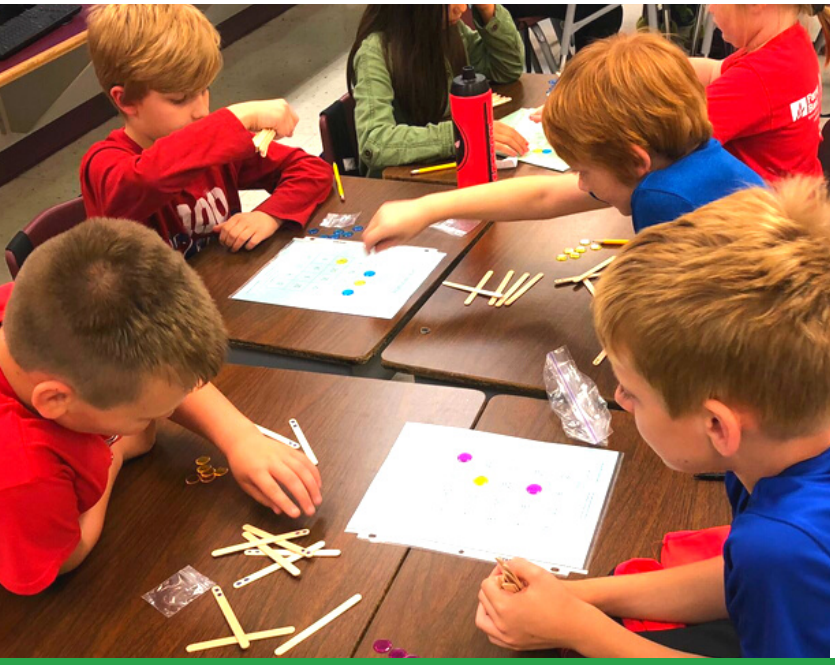
This Collegial Team Meeting was attended by seven MITs. Participants explored ways to help the MAF grant classroom teachers with the student work protocol.

Explorations in Fluency

This Progress Monitoring Collegial Team Meeting provided eight participants with materials for using specific assessments and also gave the teachers experience administering assessment questions and tracking student growth.

"I enjoyed not just the actual resources, but also lessons that align with the standards and ways to implement instruction using them."

ELEMENTARY



Explorations in 3rd Grade Multiplication and Division

The first critical area of focus for third grade is developing understanding of and strategies for multiplication and division within 100. During this session, 34 teachers explored contexts and tasks designed to support students in their journey toward multiplicative fluency within 100.

Explorations in Math Routines & Number Talks for Intermediate Grades 3-5

This course provided an opportunity for 14 classroom teachers of students in grades 3-5 to learn strategies and acquire tools to advance students' mathematical reasoning. Topics covered included addition, subtraction and place value; the use of instructional routines including number talks; and the use of manipulatives, visual models and number lines.

Explorations in 4th & 5th Grade Multiplication and Division

Multiplicative reasoning in grades 4 & 5 builds on strategies and understandings developed in third grade. Number talks and problem strings were used by 37 teachers who explored opportunities to develop relational reasoning, a deeper understanding of the distributive and commutative properties and extend these understandings to work with multi-digit and rational numbers.

ELEMENTARY

"I learned so much about how everyone thinks and how to see math differently."

Explorations in Creating School-Wide Cultures of Mathematics Sense-making

In this learning experience, 50 teachers were given opportunities to discuss the potential of lessons for deep student learning. Debriefing focused on how and why different schools might implement lessons structured around rich mathematics problems.

Explorations in Math Mindsets Grades 4 & 5

This learning experience featured opportunities for 16 teachers to participate in conceptual mathematics and examine student thinking that is possible with low-floor, high-ceiling tasks which engage students in visualizing, exploring and talking about the big mathematical ideas.

ELEMENTARY

Explorations in 3rd Grade Fractions

In this session, 36 teachers explored hands-on activities designed to support students in developing conceptual understandings of fractions as numbers. Teachers deepened their understanding of fraction standards, seeing them as part of a progression.

Explorations in 4th and 5th Grade Fractions

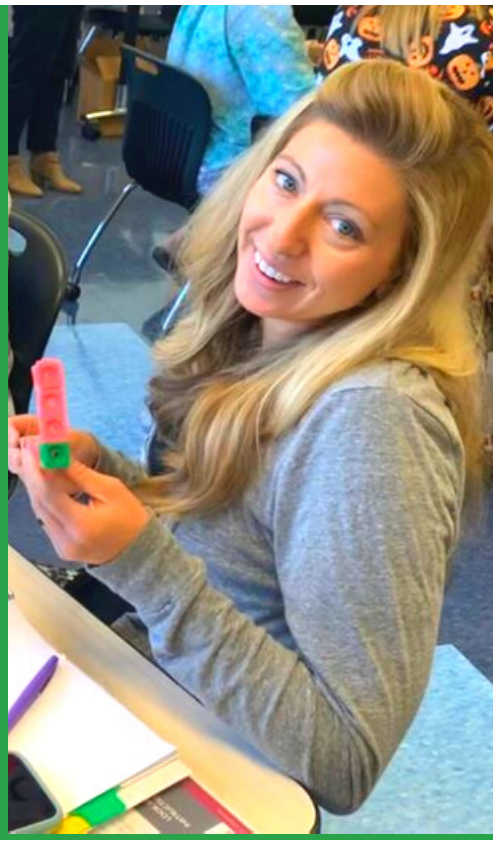
During this two-day session, 75 teachers explored instructional strategies such as the use of manipulatives, fraction models (including number lines) and rich tasks to assist students in developing an understanding of fractions as numbers.

Explorations in Fractions and Ratios (Grades 4-6)

Proportional reasoning, developing conceptual understanding of fractions and effective student support was explored by 22 teachers through an online, year-long book study.

Explorations in Algebraic Reasoning for Grades 3-5

During this session, 32 participants explored big ideas of algebraic reasoning for grades 3-5 and considered a variety of ways to support students in deepening their understandings of these ideas. For example, students can use a math balance to explore ideas about equivalence, equations, operations and variables.



INTERVENTION

MRIS (Math Recovery Intervention Specialist) Course

MRIS is the KCM's most rigorous learning experience. This course was attended by nine elementary grades teachers who deliver intensive mathematics intervention and help students at different ability levels. Expertise is developed in mathematics, through study, practice, collegial reflection, and application of tools and strategies for assessing and advancing student numeracy, based on the Learning Framework in Network.

KNPI (Kentucky Numeracy Project Intensive) Course

This ten day course, attended by seven educators, was built around Add+Vantage Math Recovery and was designed for elementary grades teachers to learn and practice assessments and teaching strategies for advancing students' foundational number knowledge, including addition, subtraction, multiplication and division.

"This program completely changed the way I teach math."

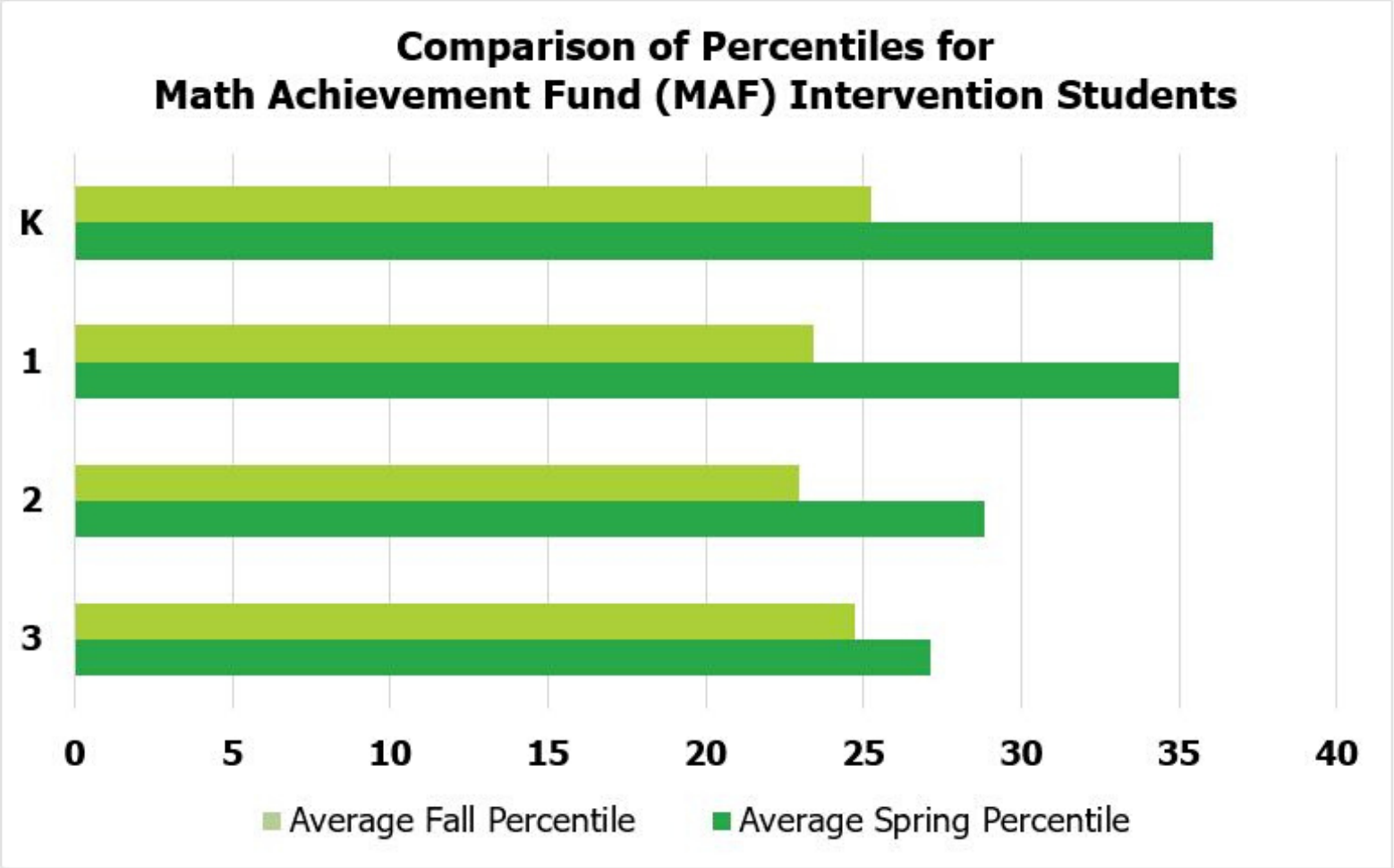
AVMR (Add+Vantage Math Recovery®)- Data & Instruction (AVMR/KNPI Graduates)

This session focused on using AVMR data to design lessons that are appropriate, purposeful and targeted for maximum student growth. Twenty-four teachers who completed AVMR or KNPI participated in this course.

MATH ACHIEVEMENT FUND

2018-19 Highlights

KCM supports the work of the KDE (Kentucky Department of Education) through MAF (Math Achievement Fund) focused professional learning opportunities, school visits and teacher assistance. Schools now have access to learning sessions and intervention services for primary students through the MAF grant.



MIDDLE SCHOOL

The two-day summer institute and virtual follow-up sessions helped 25 leaders establish productive group norms for ongoing teacher learning. Throughout the experience, participants built a repertoire of strategies and facilitation techniques as well as deepened their own understanding of Mathematics Knowledge for Teaching.

Mathematics Leadership Development for 5th & 6th Grade Teachers

"I have witnessed students' confidence in their abilities grow and can't wait to see the progress in the years to come throughout the implementation of this program in my classroom."

MIDDLE SCHOOL

This course was designed to allow teachers to learn strategies to advance students' mathematical reasoning. Participants received repeatable designs for learning that support both teachers and students in the classroom.

Explorations in Reasoning Routines for 6th and 7th Grade

Foundations for Middle: Grade 8

This four-day experience was offered in two-day sessions where 16 participants gained a greater understanding of how to support students in developing algebraic and functional reasoning.

HIGH SCHOOL

Mathematics Leadership Development for 7th, 8th, 9th & 10th Grade Teachers

The two-day summer institute and virtual follow-up sessions helped 23 leaders establish productive group norms for ongoing teacher learning. Throughout the experience, participants built a repertoire of strategies and facilitation techniques as well as deepened their own understanding of Mathematics Knowledge for Teaching. Participating teacher leaders received support from the KCM to facilitate school-based professional learning experiences utilizing the KCM-developed Transition from Middle Grades Ratios and Proportions to Algebra and Geometry.

"It was a great balance of professional learning with practice and planning. I like having my thinking challenged and stretched to better meet the needs of students."

POST-SECONDARY

In 2015, the KCM created an association of university math department chairs that meet several times a year. This association is designing a plan to promote coherence across progressive mathematics courses where lateral content connections can be made, as well as fostering productive connections with industry.

In 2018-2019 KAMTE sponsored a Statistics Education workshop and a summer institute to dive into AMTE Standards for Preparing Teachers of Mathematics.

KENTUCKY ASSOCIATION OF MATHEMATICS TEACHER EDUCATORS

NKU Collaboration:

KCM Faculty Associate Dr. Funda Gonulates has weaved many KCM principles into her work at NKU's College of Education. Dr. Gonulates' "Teaching Elementary Mathematics" course features insights gained through KCM professional learning. This course is structured around the common vision of teaching mathematics, aiming to equip preservice teachers with strategies and resources, enabling them to "plan effective mathematics discourse where students feel included and their ideas are valued." Dr. Gonulates utilizes many KCM resources to support the ideas discussed in class. She encourages her students to use games and activities provided on the KCM website, especially those found on the KNP Intervention Guide.

ADULT EDUCATION

Kentucky Skills U

In 2017-18, a KCM Regional Consultant developed resources to be used by Kentucky Skills U, formerly Kentucky Adult Education, to implement two full-year professional development courses addressing adult numeracy. EMPower Everyday Number Sense and Many Points Make a Line curriculum were used to create materials. These courses focus on helping teachers of adult learners balance conceptual understanding with procedural knowledge.

CONFERENCE

The eleventh annual KCM conference was held March 11 & 12, 2019, at the Marriott Griffin Gate in Lexington, KY. The theme of the conference was "Connect: Fostering Mathematical Minds and Communities," which encouraged educators to develop a school-wide culture that engages and guides students in making sense of mathematics.

The conference was attended by 481 educators from across the commonwealth, representing grade levels from preschool through post-secondary. Over 79 Kentucky school districts were represented and nine Post Secondary institutions. The two-day event featured 87 breakout sessions.

> "I FEEL INSPIRED TO RETURN TO MY SCHOOL AND SHARE AS MUCH AS I CAN WITH MY STAFF AND USE NEW STRATEGIES WITH MY STUDENTS!"

CONFERENCE

The 2019 Conference welcomed six fabulously talented mathematics education experts from across the country and Canada. Those special guests included: Cathy Fosnot, Grace Kelemanick, Peg Smith, Sara VanDerWerf, Marian Small and Karen Karp.

"ALL OF THE FEATURED SPEAKERS WERE ENGAGING AND PROVIDED STRATEGIES THAT WILL BE IMMEDIATELY USEFUL!!!"

Session topics spanned through all grade levels, giving teachers easily accessible and innovative classroom techniques to return home with.

ONLINE RESOURCES

The KCM has developed an arrangement of online resources and websites for continued support of participating educators. These online resources, which include assessments and research-based activities are available in a database that can be search by standard, grade level, fluency benchmark, task group or setting.

 @KyCenterforMath

 @kycenterformath

 @KyMath

KCM Website

The KCM website offers many informational resources, such as an updated calendar and registration links for all courses and conference information. Additionally, location and contact information are available.

Family Math

Family Math, the newest addition to KNP, contains activities for families based on popular excercises from the Intervention Guide. The Family Math website features online games for students and resources for parents.

Fluency Assessments

Upon receiving the appropriate training, teachers can utilize fluency assessments. These tests assess student learning of addition, subtraction, multiplication, division and fractions. Graphs and tables are created to chart the student's learning progression.

OUTREACH

> “KCM helps teachers create problem solvers!”
>
> -Erika from Cumberland County Elementary

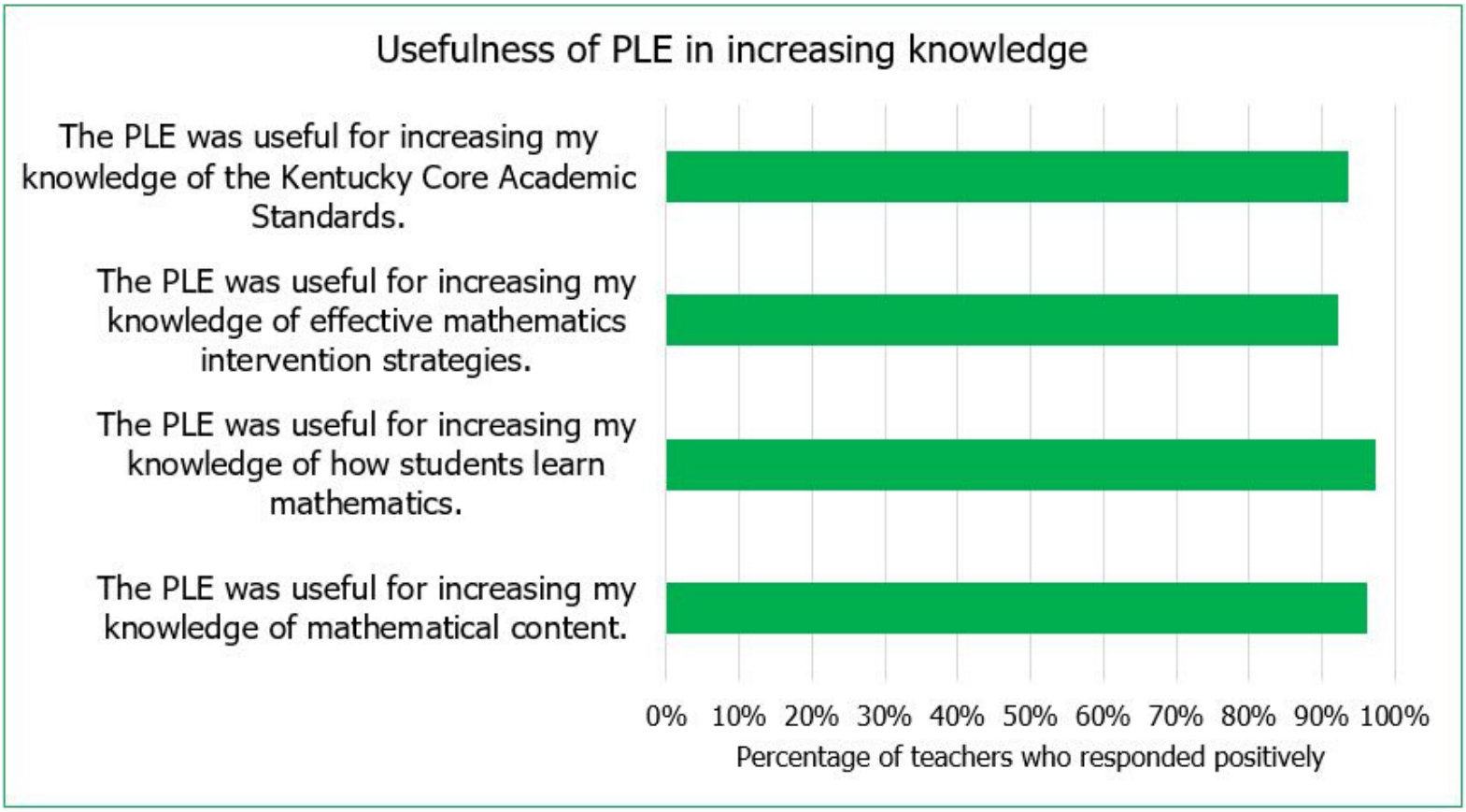
The KCM strengthens it's connection with the Kentucky mathematics community through social media presence. The center connects with members through Twitter, Facebook, Instagram, Linked In and Pinterest. These accounts share important details about course offerings, as well as resources and insights for classroom teachers.

In 2019, the KCM launched the #WhyILoveKcm campaign, which encouraged teachers to share their experiences with KCM provided PLEs, as well as classroom success stories.

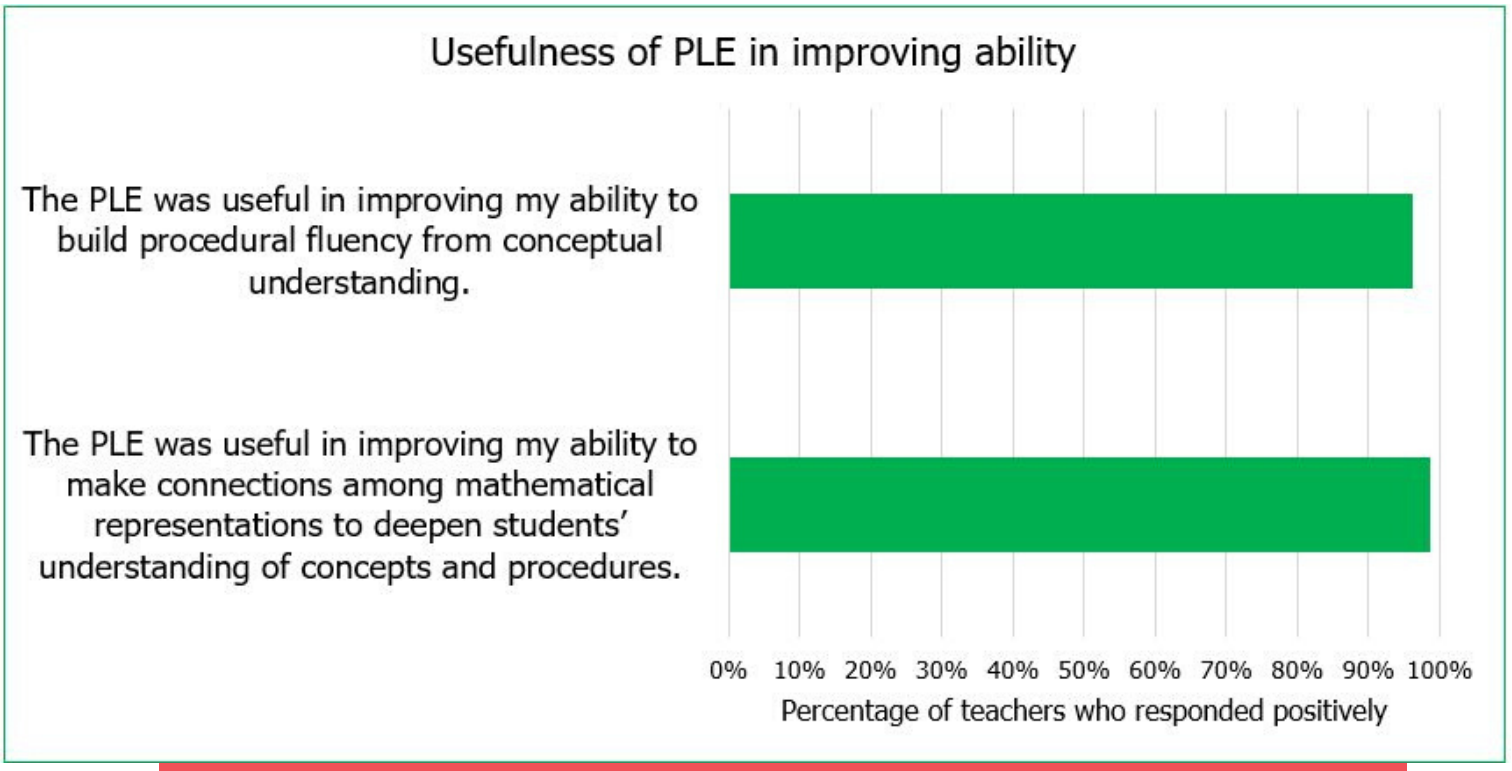
RESEARCH

End of the year surveys found that all teachers who participated in KCM professional learning experiences believed the courses were useful. Further, all teachers noted that they felt an improvement in their ability to use mathematical models to describe real-world situations.

"This program has been wonderful for my classroom as well as our school as a whole. We have learned so much and it is wonderful that we are able to send different teachers each year to receive training and then they can bring it back to our school to share."



RESEARCH



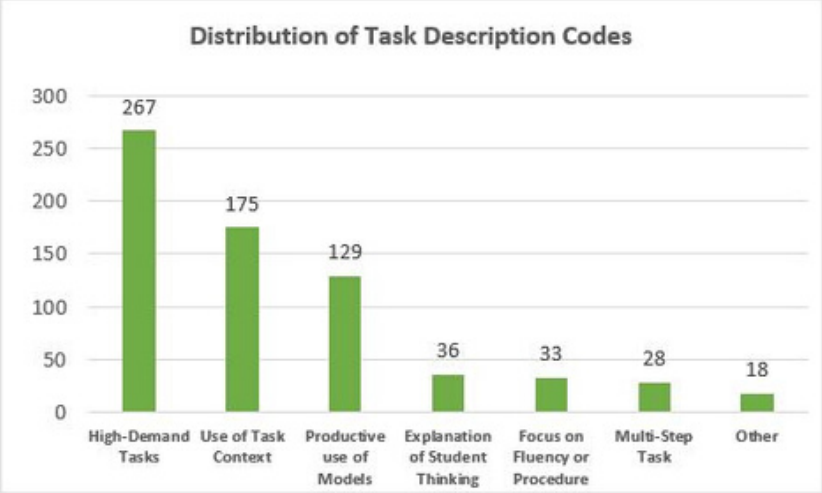
"The KCM training days were by far the best I have ever attended. My facilitator has been amazing and very helpful"

STUDENT WORK PROTOCOL

The Student Work Protocol (SWP) tool was designed for teachers to notice children's mathematical thinking and to provide structured coaching. This electronic survey prompted teachers to identify students performing at varying levels on a given task, describe their thinking, identify barriers and hypothesize next steps. Classroom teachers connected to MAF grants completed SWP submissions twice over the course of the 2018-2019 academic year.

Findings:

We reviewed submitted tasks and noted commonalities, noticing that **teachers mostly selected high demand tasks for their students' work** (n=267). We found these tasks included some context (n=175) and required students to model problem situations. There were only a few instances (n=18) where teachers selected low demand tasks.



Teacher Views on Promises of SWP:

We asked teachers to what extent they thought SWP helped or hindered their work. See the table below for teachers' mean ratings for each item.

Item	Mean Rating (n=63)
To what extent does the Student Work Protocol (SWP) tool **inform or influence your work with students** (0 no influence; 100 tremendous influence)	**59.36**
To what extent does the Student Work Protocol (SWP) tool **inform or influence your work with other teachers** (0 no influence; 100 tremendous influence)	**49.13**
To what extent does the Student Work Protocol (SWP) tool **inform or influence your work with KCM regional consultants** (0 no influence; 100 tremendous influence)	**51.54**
To what extent do you think of the SWP tool as **helpful or hindering to your work**? (0-Hindering; 100-Helpful)	**55.58**

BUDGET

FY 2019

CATEGORY	BUDGET USED
SOURCE OF FUNDS	
State General Funds	$ 1,324,000.00
Generated Revenue	$ 265,000.00
Grants	$ 37,000.00
Total Source of Funds	**$ 1,626,000.00**
USE OF FUNDS	
Teacher Professional Development- State	**$ 776,000.00**
Teacher Professional Development Services	$ 629,000.00
Teacher Resources	$ 147,000.00
Teacher Professional Development- Grants	**$ 38,000.00**
Teacher Professional Development Services	$ 14,000.00
Teacher Resources	$ 24,000.00
Salaries / Wages	**$ 372,000.00**
Benefits	**$ 290,000.00**
OPERATING EXPENSES	**$ 164,000.00**
KCM Conference (avg 600 teachers/year)	$ 85,000.00
Office Expenses	$ 79,000.00
Total Use of Funds	**$ 1,640,000.00**

2019 ANNUAL REPORT

KCM
KENTUCKY CENTER FOR MATHEMATICS

NORTHERN KENTUCKY UNIVERSITY
134 LANDRUM ACADEMIC CENTER
HIGHLAND HEIGHTS, KY 41099

TALK TO US

kcm@nku.edu
(859) 572-7690
www.kentuckymathematics.org