

Co-creation of Kentucky's Usable Innovation Process:

A How-To-Guide



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Acknowledgements

The State Implementation and Scaling-up of Evidence-based Practices (SISEP) Center, a project of the National Implementation Research Network (NIRN), wishes to acknowledge and give thanks to the Kentucky Department of Education (KDE), Office of Special Education and Early Learning (OSEEL), Kentucky Special Education Cooperative Network, districts, schools, teachers, students, and external stakeholders who have been and are currently members of the SISEP project.

Special appreciation and acknowledgement go to the Instructional Practices and Content Team (IPAC). The members of this team, with diverse perspectives and roles, dedicated time, knowledge, skills, and expertise to develop a Usable Innovation in mathematics for use in Kentucky's districts and schools. The teams shared commitment to continuous improvement of mathematics instruction is promoting increased success of student outcomes using the National Council for Teachers of Mathematics (NCTM, 2000) Teaching Practices in the form of Kentucky's Usable Innovation.

The SISEP team also wants to acknowledge the KDE leadership for allocating resources, in the form of expert facilitation and human capital, to support the IPAC Team's co-creation of a Usable Innovation for mathematics. We believe the Usable Innovation that was produced will sustain and scale across the state because it was created by the people.



Kentucky provides a national model of how to intentionally design and use an implementation infrastructure to continuously improve teacher practice and impact student outcomes. The KDE began its partnership with the SISEP Center in the fall of 2014 as a Cohort II Active Implementation State. As one of the first Active Implementation States to develop a cohort of high functioning Implementation Teams, Kentucky continues to provide invaluable learning experiences to the field of Implementation Science and has documented evidence of improved student outcomes in the area of mathematics in the first set of schools and classrooms.

The SISEP Center is funded by the U.S. Department of Education's Office of Special Education Programs (OSEP). The purpose of the SISEP Center is to help establish implementation and scaling capacity in state, regional, and district educational systems. SISEP provides content and technical assistance toward establishing large-scale, sustainable, high-fidelity implementation of effective education practices. Our shared goal is to maximize academic and social outcomes of all students, especially students with disabilities. The SISEP Center also provides technical assistance to increase knowledge of evidence-based implementation supports for evidence-based practices in Charter Management Organizations, Local Education Agency Superintendents and other leaders, and Technical Assistance Centers and projects funded by the U.S. Department of Education's Office of Special Education Programs (OSEP).

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This How-To-Guide provides links to modules, lessons, activity templates, and Kentucky examples now found on the AiHub.



Icons for AiHub and Kentucky throughout the guide indicate active links on the page.



In 2018, the Kentucky Department of Education (KDE) and the State Implementation and Scaling-up of Evidence-based Practices (SISEP) Center released a white paper, *Accomplishing Effective and Durable Change to Support Improved Student Outcomes*, that describes the trials and learning of the KDE, Kentucky's educators and their stakeholders as they used the Active Implementation Frameworks to improve mathematics outcomes and close persistent educational disparities (Ryan Jackson et al., 2018). In this paper the term Kentucky is used to represent the co-creative partnership between KDE leadership and staff, Kentucky's educators, and their stakeholders directly or indirectly involved in the SISEP project. Three follow-up publications were cited in the white paper. This paper delivers on the commitment to describe the steps Kentucky followed to develop a Usable Mathematics Innovation. This *How-To-Guide* provides links to modules, lessons, and activity templates found on the SISEP Active Implementation Hub (AiHub). Valuable examples of completed activities are provided thanks to the commitment of the KDE, Kentucky's educators, and stakeholders for their contribution to the SISEP National Community of Practice.

Overview

Work began in July of 2014 with a root cause analysis to identify the area of focus (mathematics), the population of interest (middle school special education students), and the setting (general education core instruction). Identifying an area of focus took the dedication of a team with diverse perspectives and roles. All levels of the education system (state, region, district, school, family and institutes of higher education) were represented on the team. The goal of the KDE to improve mathematics outcomes was grounded in the State Systemic Improvement Plan (SSIP) and the State Identified Measurable Result (SiMR):

“To increase the percentage of students with disabilities performing at or above proficient in middle school math, specifically at the 8th grade level, with emphasis on reducing novice performance...”

Usable Innovation



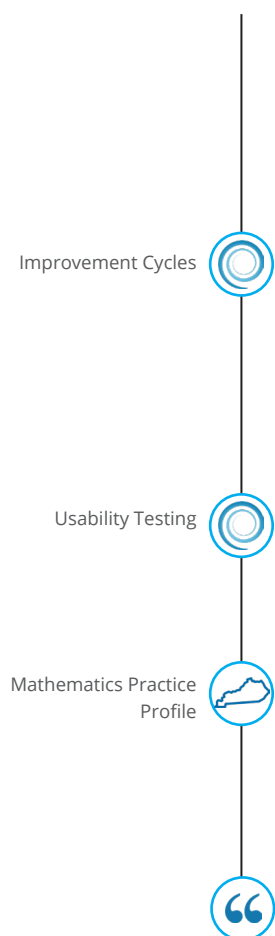
Practice Profile



Fidelity Measure



Following the selection of a focus area, a *Usable Innovation* for mathematics was developed consisting of a *Practice Profile* and a *Fidelity Measure* to clearly define and operationalize the components of mathematics instruction that could be easily observed and measured in any classroom with a teacher's unique style. The



term innovation used in this paper represents Kentucky's Usable Mathematics Innovation grounded in the National Council of Teacher of Mathematics (NCTM) 8 Mathematics Teaching Practices (NCTM, 2013).

Teams were trained on the intentional use of Plan-Do-Study-Act *Improvement Cycles*: Rapid Cycle, Practice Policy Loops, and Usability Testing for continuous improvement. Following the completion of the Usable Mathematics Innovation, competency teams developed training, coaching, and data use systems and measures to continuously improve the supports available to teachers and school staff.

Currently, the training, coaching and data-use systems are in *Usability Testing* and will be described in the third white paper. Usability Testing is used to proactively test the feasibility and impact of a new way of work prior to rolling out the implementation systems and processes more broadly. These training, coaching, and data-use systems are informed by and aligned to the *Mathematics Practice Profile's* core components and support districts' use of their chosen mathematics program, curriculum, or set of practices with evidence of effectiveness to improve mathematics outcomes (Ryan Jackson et al., 2021).

“The problem is most districts don’t have the time or resources to develop all of the systems and measures needed to use an innovation effectively – now they have the resources and support from their Regional Implementation Team.”

-IPAC Member



Active Implementation research (modules, lessons, and activities) on the Active Implementation Hub are found in italics and specific examples of Kentucky's completed activities are in bold italics with a Kentucky icon.



This publication serves as a technical paper or **How-To-Guide** with the intentional step-by-step process Kentucky used to develop a Mathematics Usable Innovation. *Active Implementation* research (modules, lessons, and activities) on the Active Implementation Hub are found in *italics* and specific examples of Kentucky's completed activities are in **bold italics** and linked to the AiHub for your use and convenience. For a visual timeline including month, year, number of participants and meetings, and total hours for completion of each component refer to ***Kentucky's Usable Innovation Timeline***. We hope these resources will support your organizations development of a Usable Innovation.

“We had so many people involved we have developed a lot of capacity, we have become very efficient. It took 6 months to develop the Math Practice Profile, 2 months to develop a coaching Practice Profile with participants using a variety of coaching systems, and 2 meetings to develop a Data Use Practice Profile – that’s the proof of our capacity.”

- State Leadership

Root Cause Analysis

In August of 2014, the SISEP Center and executive leaders from the KDE developed *Selection Criteria* for the mutual selection of Kentucky stakeholders to engage in a comprehensive review of student data in the area of literacy and mathematics. The selection criteria allowed the KDE to identify a diverse team with the knowledge, skills, and characteristics required to complete this task (e.g., facilitation, data analysis, content expertise, context knowledge). Once team members were selected (n = 22), they created a *Terms of Reference* that defined the team’s purpose, roles, deliverables, and communication loops to ensure all members and their stakeholders were informed of the team’s progress, from start to finish between team members and their stakeholders. Implementation Specialists from SISEP provided mini lessons on the use of the Active Implementation Frameworks to develop the capacity (e.g., knowledge, skills, abilities) of two *State Transformation Specialists* to lead systems change and use of implementation science.

A *Root Cause Analysis* was conducted using multiple forms of data. For example, state proficiency data for mathematics and literacy, drop-out statistics, and College and Career Readiness. The data revealed that over 70% of students with disabilities (SWD) were not

Rapid Improvement Cycles



proficient in elementary school mathematics; more than 80% of SWD were not proficient in middle school mathematics; and while 70% of SWD graduated from high school in 2014, only 22% were college and career ready (Kentucky Performance Rating for Educational Progress K-PREP, 2013-14). The team used *Rapid Improvement Cycles* to examine the data and come to consensus on middle school mathematics in the general education setting as the area of focus and identified SWD as the target population. In addition, the team reviewed the Teaching, Empowering, Leading and Learning (TELL) survey data (Kentucky’s working conditions survey). Closing the achievement gap, differentiating instruction, integrating technology, and training to support SWD were identified as the largest areas of need by Kentucky educators (KDE State Systemic Improvement Plan I, 2015). The data revealed a need for an implementation and improvement infrastructure (training, coaching, data-use support system). Using the science of Active Implementation, the team concluded that once mathematics instruction was clearly defined and operationalized, systems of training, coaching and data use could be developed to meet the needs of Kentucky educators.

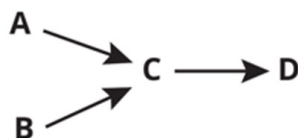
Setting a goal for improvement takes time. This first step is critical as it identifies an area of focus so that teams at every level of the system can develop an infrastructure to effectively implement one thing and replicate processes as they are proven to be effective. Development of a Usable Innovation and putting it to use by practitioners will move an organization from Event Oriented Thinking (root cause event) to Systems Thinking (feedback loops to understand and continuously improve the system). See Figure 1.

FIG. 1

Event Oriented Thinking and Systems Thinking

Event Oriented Thinking

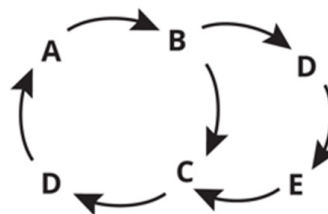
Thinks in straight lines



In event oriented thinking everything can be explained by causal chains of events. From this perspective the **root causes** are the events starting the chains of cause and effect, such as A and B.

Systems Thinking

Thinks in loop structure



In systems thinking a system’s behavior emerges from the structure of its feedback loops. **Root causes** are not individual nodes. They are the forces emerging from particular feedback loops.

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<http://thwink.org/>

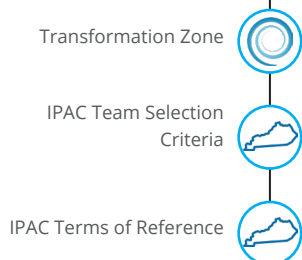
Development of a Usable Innovation and then putting it to use by practitioners will move the organization from Event Oriented Thinking (root cause an effect) to Systems Thinking (designing a Usable Mathematics Innovation for continuous improvement using Plan Do Study Act Improvement Cycles) (Kainz, 2018).

Co-creation of a Mathematics Usable Innovation

In December of 2014, with the support of SISEP the KDE State Transformation Specialists, educators, and their stakeholders set out to develop a Mathematics Usable Innovation. The KDE recognized a quality standard for math instruction was lacking. So, the state selected a team of educators to clearly define and operationalize the core components of mathematics instruction. Kentucky educators developed the first three criteria of a Usable Innovation by agreeing on a common philosophy, defining, and then operationalizing each core component. The original goal was to identify a few mathematics initiatives that were widely used in the state so regional partners would have the resources and capacity to provide high-quality training and coaching to district and school staff selected to participate in Kentucky's Transformation Zone (Ryan Jackson et al., 2018). In this white paper and in Kentucky, we define initiative as any program, curriculum or set of practices a district selects to effectively implement Kentucky's Mathematics Innovation grounded in the NCTM 8 Mathematical Teaching Practices.

TEAM SELECTION

The KDE replicated the process used to develop selection criteria for the Root Cause team. However, the team selection process was more efficient this time because they developed the capacity to form a high functioning team. One example was repurposing Root Cause Team members who had already received mini lessons on Active Implementation. Then, other team members were mutually selected for expertise in mathematics instruction, implementation science, and knowledge of local district and school context. Consideration was also given to selection of diverse perspectives and roles (e.g., school and district staff, state mathematics experts, university researchers) to generate buy-in, ownership, and collective commitment in the *Transformation Zone*. The selected members were identified as the Instructional Practices and Content team (IPAC: n =14). See Example, *IPAC Team Selection Criteria*. Once selection was concluded, the team received training on how to complete a Terms of Reference during the first meeting in December, 2014. See Example, *IPAC Terms of Reference*.





“At the beginning I wondered why I was here and then it became clear why we were here. The Terms of Reference provided a rationale to support communication among and across stakeholders.”

-IPAC Member



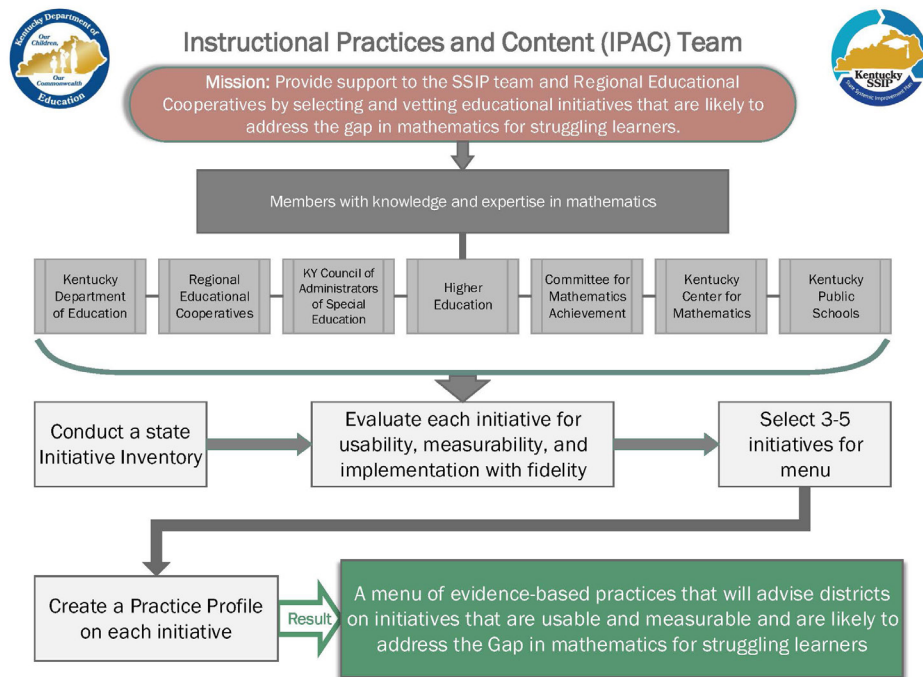
IPAC Infographic



Then, the **IPAC infographic** was developed to conceptualize the work of the team and share with the greater community (revised in 2018 from trial and learning). See Figure 2. The IPAC team was responsible for developing the Mathematics Practice Profile that would go on to be the foundation for training, coaching and data-use systems and measures.

FIG. 2

Instructional Practices and Content Team Infographic





“Our math program selection processes were not as thorough as it could have been if we had used the Initiative Inventory, Hexagon, and Literature review tools. We were thankful that our math program aligned with the Kentucky Practice Profile and met NCTM criteria.”

- District Administrator

Developing Practice Profiles



Developing a Usable Innovation for Mathematics

Kentucky relied on the expertise of SISEP liaisons and used resources from the AiHub and NIRN website to guide them through the process. They read *Developing Practice Profiles* (Metz et al., 2011) and relied heavily on section III and V. See, [Developing Practice Profiles](#).

INITIATIVE INVENTORY

The purpose of the Initiative Inventory is to guide an organization's review of current initiatives that have evidence of impact or in Kentucky's case, innovations that are in use and have evidence of improving student's mathematics outcomes. The tool is designed and used to ensure diverse perspectives through a facilitated process. To complete the Initiative Inventory, the workgroup made slight modifications to a few items to meet their needs in the area of mathematics. Items included: Innovation Name (grade level, strategy or focus), Expected Outcome, Target Population, Mandatory/Regulatory, Financial Commitment, State Priority, Level of Success, Evidence of Outcomes, Comments. They gathered information on each item through informal interviews and document reviews with regional, district, and school staff, math practitioners, coaches, and university partners, as well as information regarding resource allocation and supports for districts and teachers to determine if they were sufficient to effectively use the innovation. See example, [Guidance for Conducting Interviews](#) (Metz, 2016). They identified 30 widely used math innovations in the state. See Example, [Kentucky Math Initiative Inventory](#).

Guidance for Conducting Interviews



KY Math Initiative Inventory



“It’s automatic now, I was a reluctant participant, but as the process evolved it started making more sense. Now, we are able to draw upon this work for future reluctant educators, to communicate up front how the activities, systems, and measures, while all interconnected serve multiple purposes.”

- IPAC Member

KY Literature Review



LITERATURE REVIEW

The purpose of a literature review is to gather evidence related to best practice and to identify the competencies required to use an innovation effectively. This workgroup gathered and documented literature from peer-reviewed journal articles, mathematics organizations, and research underway by Kentucky researchers, university and community partners. See Example, [Kentucky Literature Review](#). The inclusion of university partners allows teams to have easy access to relevant research. Through this process, they also reviewed research from the NCTM. This is when the IPAC team realized that the data gathered from the Initiative Inventory, informal interviews, and literature review converged and began to reveal Kentucky's philosophy for teaching mathematics. All of the information collected and documented was brought to bear when the team completed the next step using the Hexagon Discussion and Analysis Tool. With this tool they assessed the 30 widely used mathematics innovations in Kentucky schools for fit and feasibility of effective use in districts and schools.



“Using the Hexagon verified for us that there was a selection criterion for choosing an innovation.”

- District Administrator

HEXAGON DISCUSSION AND ANALYSIS TOOL

The purpose of the Hexagon Discussion and Analysis tool is to assist organizations in the evaluation of new or existing innovations. A team with content expertise, diverse perspectives, and knowledge of the local context assesses the innovations to determine if they meet the need of the identified population, fits and aligns with other innovations in use, and that the organization has the capacity to sustain use of the innovation (e.g., financial commitment). The innovation is also assessed for evidence of effectiveness, supports for implementation (e.g., training and coaching supports), and usability across a range of contexts (e.g., it is well defined) using a Likert Scale, 1-5. This information allowed the team to make an informed decision regarding the innovations with the strongest evidence for use in practice.



“Use of the Hexagon allows you to have those frank conversations, and it is ok if the district math program has a gap as long as you are prepared to fill it or select something else to push in and use in a coordinated effort, it allows districts to see where growth is needed.”

-District Administrator



The entire team gathered to edit the generic discussion and analysis questions developed by SISEP liaisons that were associated with each component of the Hexagon. They used the information from the informal interviews, documents and literature reviews, and the NCTM 8 Teaching Practices. The team also established a set of criteria and process to review the 30 widely used innovations. First, the team only analyzed innovations that served elementary and middle school students in general education core instruction, including students with disabilities. If an innovation was a commercial textbook not aligned with NCTM, an online program, or an intervention for targeted or intensive instruction it was removed. Using this criteria, 23 innovations were removed. Then, three of the remaining seven innovations were removed after reviewing the first two categories of the Hexagon (Need and Fit) because there was not specific evidence that the three innovations addressed the identified area of need (students in special education) or that they fit with the state priorities (innovation delivered in general education classroom instruction). The Hexagon data suggested that the four innovations remaining had a high likelihood of consistent use by teachers – there were available resources to build capacity for use of the innovations in the state. See Example, [***Kentucky Hexagon Discussion and Analysis Tool for Mathematics.***](#)





“We learned through productive struggle, we had such a struggle that we had to all come together, we all had some strong opinions, when we had a strong opinion it made us go back and see if it aligned with the research on math and one of those NCTM practices. It made us think - everything that we train has to be aligned with that Practice Profile, because it is Kentucky’s Practice Profile.”

-IPAC Member

PRACTICE PROFILE: COMMON PHILOSOPHY AND CORE COMPONENTS

All of the information gathered (Initiative Inventory, informal interviews, document and literature reviews and Hexagon data) coalesced to reveal a direct match between Kentucky’s philosophy for teaching math, innovations in use in Kentucky’s schools, and the NCTM 8 Mathematics Teaching Practices. See, [Principles to Action Executive Summary](#) (2000). The team agreed that the NCTM Practices would be the eight core components (or essential functions) of the Mathematics Practice Profile. As a result, the first two criteria of a Usable Innovation were complete with the development of a clear philosophy and identification of core components.

PRACTICE PROFILE: OPERATIONALLY DEFINING CORE COMPONENTS

Operationally defining the eight core components for Accomplished Use was critical, as well as 3-5 indicators for each core component. The operational definitions and indicators serve as a guide to measure practice as intended using a walkthrough or fidelity measure. In addition, they inform the development of training and coaching systems to continuously improve teacher practice. Clearly defining the core components and indicators, in operational terms, allows all coaches, teachers, and school staff to clearly understand the goal of instruction and collectively commit to continuous improvement.



“Using the Hexagon allows you to make decisions, not that you will throw out a math program, you can fill the gaps. Maybe ask, do you have the coaching supports for a program’s success?”

- IPAC Member

Principles to Action
Executive Summary



KY Advice for Reviewing
Practice Profile Indicators



To accomplish this task the IPAC team divided into three groups. Each group began to develop a Practice Profile for the innovation they had experience developing or using in districts and schools for Accomplished Use by teachers (Developmental and Ineffective indicators would be the next step). When the three Practice Profiles were in the first draft, the teams came together for two 4-hour meetings to analyze each Practice Profile's Accomplished Use category. They examined how each team operationally defined the eight core components (3-5 item descriptors for each component). They developed *Kentucky Advice for Reviewing Practice Profile Indicators* (NIRN, 2011). They asked: Is the indicator (or activity) a priority? If yes, they asked is the indicator measurable, and if not, can we make it measurable? Then, they asked does the indicator belong somewhere else or should it be removed? It was during their second meeting that the three teams realized if Kentucky has a common philosophy for teaching math, then the operational definitions should remain constant and apply to any mathematics innovation as long as it aligned with the eight core components of the Practice Profile.



“We were assigned to an initiative (math program) we had a lot of background in, we wrote three Practice Profiles and came back as a team and realized there was so much in common with all of the Profiles that we only needed one Practice Profile aligned to NCTM.”

- IPAC Member



KY Mathematics Innovation
Practice Profile V3



For each of the eight components they developed one operational definition and associated indicators for Accomplished Use. Finally, they operationalized two additional developmental variations – Developmental Use and Ineffective Use. The result was one common Mathematics Practice Profile for Kentucky – no matter what mathematics innovation a district chose. See Example [Kentucky Mathematics Innovation Practice Profile V3](#).

VETTING

Next, a few team members informally vetted the Practice Profile with mathematics experts and staff in a few schools. This was an important step to solicit authentic voice from the field and get ready to use the Practice Profile in schools and with coaches and teachers. The team did not receive any recommendations for revision. This may be attributed to the thorough literature and document reviews conducted and use of the NCTM Practices as the core components of the Practice Profile. See example, [Vetting and Consensus Guidance](#) (Metz, 2016) for a guide to accomplishing this important step.

Vetting and Consensus
Guidance



SELECTING A FIDELITY MEASURE

Selecting a fidelity measure is the last step or component of a Usable Innovation. An easy to use fidelity measure aligned with Kentucky's Mathematics Practice Profile did not exist, so Kentucky chose to use the Observation Tool for Instructional Support Systems (OTISS, 2015) after on-going deliberation by the KDE executive leaders, using feedback from the IPAC and practitioners in the Transformation Zone who would be trained to use the fidelity measure. The IPAC team was clear that their goal was to eventually develop a math-specific walkthrough that was aligned with their Mathematics Practice Profile.



“We started with the OTISS fidelity measure because there was not a math fidelity measure aligned with the Practice Profile.”

- IPAC Member

The OTISS is a content and grade level neutral measure that assesses general aspects of high-quality instruction to inform supports that are or are not in place to support teachers' effective use of an effective mathematics practice (e.g., training, coaching, data use support). The research basis for the OTISS is Visible Learning (Hattie, 2009), a meta-analysis of over 800 meta-analyses including over 50,000 studies related to student achievement. The measure consists of seven evidence-based instructional practices that are highly correlated with student learning. See Example, [OTISS Items](#)

OTISS Items and Hattie
Effect Size





and Hattie Effect Size. A few members of the IPAC team completed a cross-walk of the Mathematics Practice Profile and the OTISS items. They found alignment between the OTISS' seven items and the eight components of the Mathematics Practice Profile. See Example, ***Kentucky Crosswalk, Mathematics Practice Profile and OTISS***. OTISS observations are conducted by trained observers who achieve inter-rater reliability. Data is collected and used in aggregate to assess the systems of support available to teachers. The OTISS is not used for teacher evaluation and individual teacher data is not viewed. The aggregate data is lifted up to the Implementation Teams with the authority and resources to take responsibility for ensuring effective and efficient systems of support are available to teachers.

DISTRICT SELECTION OF A MATHEMATICS PROGRAM

The IPAC Team developed short videos to briefly describe the three innovations that were widely used in the state however, use of the three innovations was not required to participate in the Transformation Zone. Some districts already had a mathematics innovation they were using that they wanted to strengthen and some wanted to explore other mathematics programs or curriculum with evidence of effectiveness with the expert guidance of their Regional Cooperative. Regional Implementation Teams provide expert support as they facilitate a process using the Initiative Inventory and the Hexagon Tool to guide a district in the selection of a mathematics innovation with evidence and aligned to the Mathematics Practice Profile. When a Hexagon factor is scored low, the Regional Implementation Team assists the district in strengthening the factor.



“Now we had an example that we could show folks - what it means to operationalize a practice, they understand it is a tool to help a coach, help a team know what it looks like, sounds like, feels like in the classroom.”

- Regional Implementation Team Member and Coach



For example, some districts may not have an on-going training system for teachers, so they are supported in securing initial and on-going training. Some districts chose to abandon their innovation and chose an innovation with readily available training and coaching supports. As time goes on, the capacity of regional and district staff to provide training and coaching on common mathematics innovations in Kentucky has developed and evidence of improved outcomes in districts that are using these innovations is documented (Trial and Learning in Kentucky's Transformation Zone, forthcoming). So, the original goal to develop the capacity of mathematics trainers and coaches in Kentucky to effectively use a few proven mathematics programs, curriculum, or set of practices may come to fruition as capacity is developed and evidence is documented of improved student outcomes.



“The training for teachers and the coach is key so they know how to tailor the Practice Profile to the grade level.”

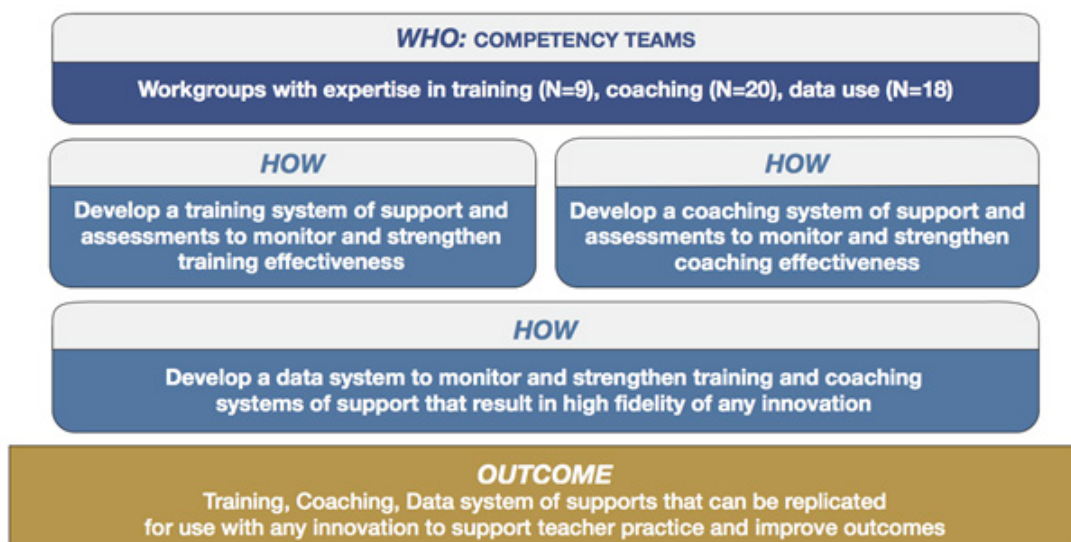
- IPAC Member

HOW KENTUCKY PUT INTO PRACTICE A USABLE INNOVATION

The next white paper delivers on the commitment to describe How Kentucky Stakeholders Put into Practice a Usable Innovation: Measuring the Independent Variable (Forthcoming in 2020-21). See Figure 3.

FIG. 3

WHAT:
Kentucky's Usable Math Innovation
Teachable, Learnable, Doable, and Easily Assessed in Practice
 To close the gap for struggling students



KY Data Dashboard



KY PDSA Process



The ability to use a common Mathematics Practice Profile and Fidelity Measure (Usable Innovation), no matter what program, curriculum or set of practices a district may choose, provides a great service to districts. When districts choose to be part of the Transformation Zone they get expert support from their Regional Implementation Team in the selection of a mathematics program aligned with Kentucky's Mathematics Practice Profile. Then, they have access to common training, coaching, data systems and measures for continuous improvement – all developed by Kentucky's stakeholders and supported by the KDE in the [Kentucky Data Dashboard](#). Teams can easily access and use data at monthly implementation team meetings using a PDSA protocol and Rapid Improvement Cycles. See Example, [Kentucky PDSA process](#).

“We have had so many people involved we have developed a lot of capacity, we have become very efficient. It took 6 months to develop the Math Practice Profile, 2 months to develop a coaching Practice Profile with participants using a variety of coaching systems, and 2 meetings to develop a Data Use Practice Profile – that’s the proof of our capacity, and sustainability.”

-State Administrator

Using lessons learned from use of the OTISS in Transformation Zone schools, members of the original IPAC team, mathematics experts from Kentucky's Transformation Zone, and community partners developed a math specific walkthrough measure in 2019. The measure is aligned to the Mathematics Practice Profiles and will be Usability Testing during the 2020-21 school year. Kentucky's capacity data from Transformation Zone districts and schools demonstrates that a district's schools can enter into Initial Implementation in one year, begin to produce improved outcomes for all students, and close long-standing disparities for students with disabilities (the target population), as well as other disparity groups (KDE State Systemic Improvement Plan 111, 2019; Ryan Jackson & Ward, 2019). Now, Kentucky's districts can imagine a different future for all students as they provide equitable supports to all and close long-standing disparities in mathematics outcomes.

Lessons Learned

Throughout the process of creating a Usable Mathematics Innovation, the KDE and SISEP liaisons identified key learnings, actions to replicate or actions to avoid as teams proactively prepare for the development of a Usable Innovation.



ENGAGE STAKEHOLDERS.

Engage diverse teams at every level to co-create the Usable Innovation so that everyone can see themselves in the work. When this was done, there was widespread buy-in and ownership. Ensure voice from every level of the organization. In Kentucky, if we had collected interview and survey data in a more systematic and formalized manner we could have used it to inform future processes for engaging stakeholders and prevented the need to return to exploration stage activities to gain buy-in.



COMMUNICATION.

Bring everyone along in the process. Consistently communicate with all stakeholders the rationales for use of all steps in the process. Explain why a Usable Mathematics Innovation is critical to supporting teachers who improve student outcomes. This supports collective commitment for using the innovation. In addition, a communication protocol between teams and a communication plan to external stakeholders is critical to ensure key stakeholders are informed and have a mechanism for providing authentic feedback. This supports meaningful, ongoing communication. When communication is not strategically planned and documented, it can get lost and key opportunities and leverage points for input may be missed.



TEAM SELECTION.

Take the time to select diverse participants with a variety of knowledge, skills, abilities, and perspectives that are required to complete all tasks. Participants will gain tremendous capacity to share with new partners in the work. Ensure you are strategic in selecting key stakeholders who are representative across the broader context where this skill will be used and replicated again and again. In Kentucky, there was a teacher and Assistant Superintendent on the IPAC team. Having a principal representative would have provided the school administrator perspective for the feasibility to support the implementation of the essential components of the Usable Mathematics Innovation in a school.



CONTENT USED TO DEVELOP THE USABLE INNOVATION.

Pay attention to the grain size of the innovation. Choose an innovation big enough to build an implementation infrastructure around

(training, coaching, data use system), for ease of replication and efficiency of time and resources. The team learned that if there is a common philosophy for math, then any mathematics curriculum or set of practices could align with the Practice Profile. There is no need to develop a Practice Profile for each mathematics innovation if a common philosophy is established and the core components and indicators are clearly defined.



USABILITY TESTING.

While the Practice Profile was vetted in a few schools before using it in the Transformation Zone districts and schools, the team did not formally engage in Usability Testing. The team currently developing the math-specific walkthrough made one small change; an additional indicator was added in one component. In the coming school year, the new math walkthrough tool and the Mathematics Practice Profile will go under a rigorous Usability Testing process. The Practice Profile is proving to be of sound design as its use is resulting in improved student outcomes. As the team reflected on the process, three years later, upon developing the math-specific fidelity measure they saw a key learning. Identify a proven fidelity measure with evidence of effectiveness before trying to develop a new fidelity measure. Without the trial and learning of using the OTISS to develop a process for collecting, analyzing, and using fidelity data, it would have taken a great deal of time and effort to develop the math walkthrough tool.



TEACHER VERSION OF THE PRACTICE PROFILE.

In the beginning, teachers were provided a copy of the Practice Profile with the Accomplished Use item descriptors only. Then, when coaches developed trust with the teachers they began using the Practice Profile in its entirety because it allowed the coaches and teachers to determine the needed level of support for teacher goal-setting (Accomplished Use, Developmental Use, Unexpected Use). Now, many coaches are using the practice profile continuum as a way for teachers to set their own growth goals.



FIDELITY MEASURE.

The OTISS was chosen because there was not a research-based fidelity measure for math aligned to the Practice Profile. The team acknowledged they did not have the capacity to develop a mathematics fidelity measure while they were learning how to use the Active Implementation research to develop training, coaching and data systems for effective use of a district's chosen math innovation in schools. Once the infrastructure was in place and regional teams developed the capacity to support districts and their schools, Kentucky educators began the process of developing an evidence-

based math fidelity measure (Year 5, or 2018-19). A lesson learned was to emphasize the alignment between the OTISS and Mathematics Practice Profile early on in the development of the Practice Profile. This would have supported more effective use of the OTISS data earlier in the process.

Conclusion

In summary, an overall key learning is to start small and learn how to conduct the Usable Innovation development process with a high degree of fidelity. Then, apply the process again and again, each time more quickly and efficiently with another content area - applying lessons learned for continuous improvement. This learning has become embedded into how work is accomplished by the KDE and Kentucky stakeholders. In the first Kentucky White Paper, Accomplishing Effective and Durable Change to Support Improved Student Outcomes, Kentucky's Chief Digital Officer said, "From a statewide perspective, everything we do has to be sustainable and scalable - has to be. What we needed to do here was rapid development, incubate quite a bit, and fail forward with some ideas." Now, five years later, coaches who are using Kentucky's Usable Math Innovation in schools share, "it is embedded in our work, it is part of us, it is what keeps us going."

To improve student outcomes on a useful scale, WHAT is trying to be done needs to be teachable, learnable, doable, and easily assessed in a typical education setting (Fixsen et al., 2013). Kentucky's Usable Math Innovation defines WHAT educators agree they will see in any math classroom, no matter what innovation a district may choose and no matter what unique style the teacher employs. The goal of the SISEP project in Kentucky is to effectively implement the SSIP and meet their SiMR or

"To increase the percentage of students with disabilities performing at or above proficient in middle school math, specifically at the 8th grade level, with emphasis on reducing novice performance (on the State Summative Assessment: KPRP)."

increase in the Proficient scores for SWD over a three-year period (SISEP III:4). Summative data from the two elementary schools demonstrated a reduction in Novice scores by 10.6 percentage points within two years and two middle schools demonstrated a 14.7 percentage-point decline in the Novice scale for SWD and other populations including elementary African American students and middle school students receiving Free and Reduced Lunch (SISEP III:4).



"Now, five years later, coaches who are using Kentucky's Usable Math Innovation in schools share, "it is embedded in our work, it is part of us, it is what keeps us going."

- Regional Implementation Team Member

The KDE anticipated continued growth in proficiency from districts in initial implementation during the 2019-2020 school year. Unfortunately, summative testing was cancelled due to the COVID-19 pandemic as schools prepared for a shift to non-traditional instruction. While the shift to non-traditional instruction is a daily challenge, Kentucky's educators involved in the SISEP Project continue to strengthen and refine use of mathematic practices and their Usable Innovation in support of teachers in the classroom (Ryan Jackson et al., 2021).

Usable Innovations provide the content to develop training, coaching and data use systems, as well as a mutual selection process to select the first set of teachers and staff who will use and support use of the innovation. Kentucky replicated the process used to develop the Usable Math Innovation to design training, coaching, and data use systems and measures. Putting in place a Usable innovation often requires a change in the roles, functions, and structures within State Education Agencies and the education system in general to more efficiently, effectively, and persistently improve effective support for teachers and school staff, so they can produce intended outcomes. In Kentucky, the responsibility for effective use of a district's math innovation lies on the Implementation Teams who take responsibility for effective use of a district's mathematics program (school, district, region and state). The onus no longer rests solely on the teacher or the school. Rather, any barriers to effective implementation are lifted to the team with the authority and resources to remove barriers and respond quickly with viable, context relevant solutions.



“When we started each school was doing what they thought was right - using a consistent process and curriculum has brought it all together.”

- District Administrator



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