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How Elementary Teachers Implement the Eureka Mathematics Curriculum to Improve Mathematics Outcomes

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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2023

Abstract

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M.Ed., Walden University, 2018

BS, Morgan State University, 2007

Final Study Submitted in Partial Fulfillment

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Abstract

Many states use research-based mathematics curricula as an instructional tool to improve mathematics performance outcomes on state assessment scores. The problem was that despite implementation of a research-based curriculum, students at XYZ Elementary School (pseudonym) had underperformed on the Partnership for Assessment of Readiness for College and Careers standardized mathematics tests since 2018. The purpose of this basic qualitative study was to discover implementation practices of teachers using the Eureka Mathematics Curriculum to improve student outcomes at XYZ Elementary School. Dewey's experiential learning theory was used to support and explore ideas involving influences of curriculum implementation on teacher practices. A central research question was used to address mathematic practices teachers implemented via the Eureka Mathematics Curriculum. The basic qualitative research design was used to explore the implementation practices of five mathematics teachers through interviews. Data were analyzed through open coding and compiling a matrix for review and reflection of themes and patterns. Themes included improving mathematics teaching and implementation proficiencies, roles of stakeholders in lack of mathematics success, and mathematics curriculum tools and resources. Findings may promote positive social change by identifying and improving practices for mathematics instruction to help increase student achievement.

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Dedication

This research is dedicated to the Swan, Clarke, and Carey families as well as my home country, the Commonwealth of the Bahamas. This serves as a lasting piece of history that proves that anything is possible! We are all experts in our rite!

We can do all things through the power of prayer, purpose, and perseverance.

"Lift up your head to the rising sun…… March on Bahama land!"

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Section 1: The Problem

The Local Problem

The problem of this basic qualitative study was that despite XYZ Elementary School teachers' implementation of the Eureka Mathematics Curriculum, a research-based math curriculum since 2018, students at a local elementary school had underperformed in terms of mathematics outcomes on the Partnership for Assessment Readiness for College and Careers (PARCC) standardized mathematics tests. Students' inadequacy and underachievement in terms of mathematics outcomes at the urban XYZ Elementary School (pseudonym) was a trending concern. The Principal and Vice Principal at XYZ Elementary School acknowledged that their elementary teachers perceived the current curriculum as neither sufficient, nor able to meet their grade K–5 urban learners'mathematics foundational needs. Koedel and Li (2017) stated that California's urban students' low test scores and underachievement in mathematics were relative to the quality of the curriculum used for instruction.

Mathematics skills were challenging for urban students in two large American school districts to grasp. Elementary students with a weak foundation in mathematics skills tended to have difficulties in mathematics as they continued to middle and upper elementary grade levels (Salters, 2019). XYZ Elementary School is in a low-income Title 1 urban district, and there has been a trend of student underachievement in terms of mathematics scores. According to XYZ Elementary School's Vice Principal, their elementary teachers' lack of mathematics content knowledge is a possible factor that led to trending low scores. Concurrently, Louisiana school district leaders suggested a need

for American schools to have improved professional development for teachers to address mathematics achievement concerns (Guidry, 2014). Across American school districts, there is a national need to address this gap in research and mathematics achievement among the urban elementary learners demographic. Nationally, proficiency in early mathematics knowledge was associated with racial disparities and was identified as a factor in mathematics underachievement as early as the kindergarten level (Davis & Farran, 2018). According to the Maryland State Department of Education (2020), only 27.5% of XYZ elementary students were proficient in mathematics testing. Stakeholders at XYZ Elementary School had different ideas about factors involving low mathematics achievement trends. There was a discrepancy in early mathematics proficiency levels between urban school communities with high mathematics scores and their same-aged suburban and rural community peers (Dumas, 2019).

Low proficiency levels in mathematics test scores were aligned to low socioeconomic conditions and structures, resulting in children entering schools with less mathematics knowledge than children in higher socioeconomic conditions (Davis & Farran, 2018). The achievement gap and inadequacies in terms of mathematics assessment scores faced by XYZ Elementary School are problematic. This basic qualitative study was conducted to discover XYZ Elementary teachers' practices involving implementation of the Eureka Mathematics Curriculum.

The declining trend in mathematics achievement requires data analysis and collaborative planning reforms. Within this study, I identified the school's need for XYZ Elementary teachers to address mathematics curriculum implementation practices and

determine benefits or challenges for student achievments. Koedel and Li (2017) stated the lack of efficacy in mathematics curricula and its actual material usage by teachers and students is unknown. There is a lack of information regarding curriculum quality and specific implementation practices of its users, hence providing an opportunity to discover the implementation practices at XYZ Elementary in an attempt to unveil variables contributing to the underperformance since 2018.

Table 1

Student Proficiency Percentages in Mathematics

Measure	Results
Percent proficient in mathematics	24%

The instructional tool used at XYZ Elementary School was a teacher-developed, researched-based program called the Eureka Mathematics Curriculum. The purpose of this applied curriculum tool was to help improve achievement scores across the district in which XYZ Elementary is located. The Eureka Mathematics Curriculum was aligned to some of the mathematics theories of Bolzano. Bolzano was a mathematician who promoted the theory of foundational logic in mathematics. He communicated the benefits of utlizing sequencing and scaffolding to acquire meaningful mathematics skills. Other mathematicians agreed with Bozano's theory of mathematics knowledge acquisition and also developed concepts for sequencing and relationships in mathematical theories (Bieda et al., 2019). Bolzano's ideas led to the development of theories explored in textbooks and mathematics curricula, such as the Eureka Mathematics Curriculum (Russ &

Trlifajová, 2016). In XYZ Elementary School, approximately 73% of students are underperforming in mathematics (MSDE, 2020). The purpose of this basic qualitative study was to discover implementation practices of teachers using the Eureka Mathematics Curriculum to improve student outcomes at XYZ Elementary School.

Evidence of the Problem at the Local Level

Researchers have found that urban students who underperform in mathematics tend to be limited to low-paying careers within their communities (Hentges & Galla, 2018). The deficits in mathematics achievement within this urban school setting could be an indicator of the limitations being unintentionally drafted for this population and their community. The correlation of mathematics success and career paths was a concept that collided with equity amongst school districts in America. The achievement gap and inadequacies faced by XYZ Elementary School were problematic. In Florida, a school leader stated teacher mastery of the Eureka Mathematics Curriculum content was a possible indicator of the achievement decline in elementary students' mathematics scores. Concurrently, another school leader in Florida suggested elementary schools had a local need for improved professional development for teachers to address mathematics achievement concerns (Williams, 2015). This qualitative study was conducted to discover implementation practices of teachers involving the Eureka Mathematics Curriculum to improve student outcomes at XYZ Elementary School.

Table 2

Data for Students Below Proficiency Percentages in Mathematics

Measure	Results
Percent below proficient in mathematics	76%

The Eureka Mathematics Curriculum used by this site is a research-based tool for mathematics instruction. At this urban elementary school, students were not meeting grade-level achievement scores on the PARCC assessment. The PARCC exam was a standardized reading and mathematics assessment that measured students' learning according to the Common Core State Standards (National PTA, n.d.). This was a computer-based test administered annually to students in Grades 3–12. The PARCC assessed students' critical thinking and problem-solving skills in reading and mathematics. This assessment provides a level score of 1-5 measuring a student's proficiency level in content areas. The scores indicate a student's performance level from needing intervention up to high performance (National PTA, n.d.). According to common core state standards, the PARCC is a standardized reading and mathematics assessment that measures students' learning. At XYZ Elementary School, 16.8% of their student body on average demonstrated mathematics proficiency among their mathematics student population (Maryland State Department of Education, 2020). Mathematics content knowledge proficiency is essential for teachers and students in order to acquire improved mathematics success. The leadership and teachers at XYZ Elementary School had different ideas about factors involving low mathematics achievement trends. There was

an achievement proficiency discrepancy between urban school communities achieving high mathematics scores compared to same-aged suburban and rural community peers (Dumas, 2019). The problem was that despite teachers' implementation of a research-based curriculum, students at XYZ Elementary School since 2018 had underperformed on mathematics standardized tests, which proved to be a challenge. Addressing students' underachievement in mathematics is vital to urban student audiences at XYZ Elementary School as well as instructional staff.

Evidence of the Problem at the Professional Level

In the United States, student mathematics achievement scores are a matter of concern. Officials in MD, the district, local administrators, and teachers are advocating for the decline in mathematics proficiency levels to be addressed. The National Assessment of Educational Progress recorded 40% of fourth graders, 33% of eighth graders, and 23% of 12th graders in U.S. public schools were proficient in mathematics (U.S. Department of Education, 2019). A Detroit-based school district acknowledged that the Eureka Mathematics Curriculum was a tool to improve achievement (Dixon & Palmer, 2020). Detroit school leaders further reviewed this program as the best mathematics learning standard-aligned curriculum on the market to support the need to increase elementary school mathematics scores (Dixon & Palmer, 2020). Difficulties involving mathematics achievement and proficiency was evident in nonpublic schools and public schools across America, according to the U.S. Department of Education (U.S. Department of Education, 2019). Mathematics-instructional-users in Maryland, Florida, Louisiana and Detroit perceived the Eureka Mathematics Curriculum offered too many

skills in one lesson or module, making it difficult to master or gain proficiency, which resulted in the mathematics achievement gap (Williams, 2015). Mathematics performance in U.S. schools continued with low proficiency percentages at 48% of fourth graders and 47% of eighth graders (U.S. Department of Education, 2019). These declining mathematics proficiency percentages helped to further highlight the reality that student mathematics achievement was a damaging issue that should be addressed in this country (Petrilli, 2017).

Table 3

Public and Nonpublic School National Mathematics Proficiency Percentages

Grade	Non-Public Percentage	Public Percentage
4	48%	40%
8	47%	33%
12	unknown	23%

Note. From "The Nation's report card | *NAEP* (2019)." National Center for Education Statistics (NCES), a part of the U.S. Department of Education (The Nation's report card, https://www.nationsreportcard.gov/, 2019).

On a global scale, American students are underperforming in terms of mathematics achievement (Schleicher, 2019). The Organization of Economic Cooperation and Development (OECD) established a five-level proficiency rating Programme for International Student Assessment (PISA). The PISA measures students' abilities in reading, mathematics, and science in order to prepare them to meet real-life challenges. International baccalaureate schools worldwide use the Eureka Mathematics Curriculum and are assessed collectively by PISA. The PISA ranked U.S. students 13th

out of 79 countries (Schleicher, 2019). Richards (2020) stated, "the different teaching methods of other countries were the reason why the United States scores stink" (p. #). In the United States, 8% of students performed at level 5 in mathematics, whereas students in China placed first, with 44% of learners performing at level 5 in mathematics (Schleicher, 2019). PISA results suggested that American students are underachieving in mathematics.

Table 4

PISA Mathematics Results for the US

Country	Rank	Mathematics Average
United States	13	478

Note. From "Organization of Economic Cooperation and Development," by Schleicher, 2019. (Schleicher, 2019).

Rationale

The goal of the basic qualitative research study was to understand teachers' implementation of a research-based curriculum for students at XYZ Elementary School and explore barriers students face involving improvement on mathematics tests. To improve mathematics achievement, Maryland state leaders communicated the local need to improve mathematics assessment data and indicated that 73% of students were below proficiency levels (Maryland State Department of Education, 2020). Mathematics is a subject area that is essential to elevating the socioeconomic status of a community, as it fosters higher-order reasoning skills that facilitate daily functionality (Ozkaya & Karaca, 2017). Since 2018, this urban district implemented the Eureka Mathematics Curriculum

with district support for instruction being provided via professional development for the Eureka Mathematics curriculum implementation staff at XYZ Elementary School to promote effective implementation. Despite this professional development, improved student outcomes remained a challenge.

According to this city's teacher evaluation protocols, teachers were expected to meet standards in order to identify and target actions of students and teachers for effectiveness. Teachers that did not meet or exceed these performance indicators were placed on a Performance Improvement Plan (PIP). The PIP was instituted to provide additional support to the teacher to promote improved instructional practices. According to Maryland's governor, 2,071 students assessed in this urban district were found to be nonproficient in mathematics (Maryland State Department of Education, 2020). Maryland's state's superintendent proposed restructuring the department in terms of professional development and rigorous teacher preparation programs to help improve student outcomes. The CEO of this urban district said examining teachers' experiences daily while attending to adult learning was an effective strategy for improving student outcomes.

The problem was that despite teachers' implementation of a research-based curriculum, students at XYZ Elementary School for the past 5 years have underperformed on mathematics standardized tests, which resulted in long-term impacts. Student achievement scores are used to determine choices for middle school, high school, and college admissions (Hentges & Galla, 2018). Implementing a research-based curriculum for urban communities is essential to their academic success (Dumas, 2019).

Discovery of teacher implementation practices involving the Eureka Mathematics Curriculum is critical to developing higher-achieving urban learners as well as to service urban students with high quality instruction to equip them with competencies to secure improved career choices within their communities The purpose of this basic qualitative study was to discover implementation practices of teachers involving the Eureka Mathematics Curriculum to improve student outcomes at XYZ Elementary School.

Definition of Terms

The following terms were utilized throughout this study:

Best Practices: Best practices are actions and processes used to enhance or improve instruction and implementation. This involves reflective evaluation of teacher and student actions, performance, outcomes, and educational protocols.

Eureka Mathematics Curriculum: The Eureka Mathematics Curriculum is a teacher and researcher-developed mathematics curriculum. Rhind's principles of numerical relationships and base 10 numerologies are embedded in the Eureka Mathematics Curriculum.

Implementation: Implementation refers to strategic and intentional delivery of curriculum material. Implementation refers to educators disseminating content and skills knowledge to the student audience as a practice (ASCD, 2018).

Proficiency: Proficiency is the ability to achieve a cumulative score or grade in order to determine a student's mastery level on state academic standards or assessments. Scores and grades indicate student achievement in a content area. Many institutions use

scores or grades as descriptors for measuring mastery or ability. Ability to obtain recommended scores is used to determine academic promotion or retention.

Professional Development: Professional development refers to formal learning opportunities for educators to refine their knowledge of pedagogies (Darling-Hammond et al., 2017). Professional development sessions are usually hosted by experts within a field or content area who provide proactive research-based strategies or interventions. They are designed to meet or address needs involving an existing area of concern for stakeholders. At times, professional development is differentiated and used to introduce or explore new resources and products for instructional design.

Significance of the Study

This basic qualitative research was used to determine implementation practices of teachers involving the Eureka Mathematics Curriculum to improve student outcomes at XYZ Elementary School. The problem was that despite teachers' implementation of this curriculum, students at XYZ Elementary School have underperformed on mathematics standardized tests for the past 5 years. Therefore, I conducted interviews to discover teachers' implementation practices of using the Eureka Mathematics Curriculum at XYZ Elementary School to improve student mathematics outcomes.

Dewey's experiential learning theory was constructed to collect knowledge based on personal experiences. The research was significantly based on the need to investigate implementation practices involved with this curriculum to instruct students in mathematics. Quality curriculum contributes to enhanced academic success. The Eureka

Mathematics Curriculum is being used nationwide, and very little literature has addressed implementation practices involving teachers who practice this curriculum.

This study's findings may lead to improved professional practices involving the implementation of the Eureka Mathematics Curriculum to improve mathematics outcomes. This research may serve as a guide to improve teacher implementation nationwide, which may lead to increased quality of mathematics instruction as well as improved implementation reflective practices and readiness levels for all Eureka Mathematics Curriculum instructional users. Improved mathematics curriculum implementation standards support the instructional needs of underachieving urban school communities. Teachers' implementation practices involving mathematics curriculum to improve mathematics outcomes may lead to social change opportunities.

Teachers incorporate and engage students in real-world mathematic problems to solve in local communities as an implementation practice. Additionally, the Eureka Mathematics Curriculum is a revised method to empower learners with making correlations between mathematics and the world around them. Improved mathematics curriculum implementation allows the ability to acquire critical concepts (Ucifferri, 2020).

Research Questions

The following research question guided this study:

RQ*:* How do teachers implement the Eureka Mathematics Curriculum?

To achieve a more comprehensive study, sub-questions that generate high-quality outcomes were utilized. Creswell and Guetterman (2019) shared the importance of

understanding the experiences of people to develop an in-depth outcome. To obtain more comprehensive data, the following subquestions were designed:

SQ1: How do teachers implement the Eureka Mathematics Curriculum to improve student outcomes?

SQ2: What concerns do teachers have involving the implementation of the Eureka Mathematics Curriculum?

SQ3: What resources do teachers need to improve or maintain implementation of the Eureka Mathematics Curriculum?

Review of the Literature

The literature review provided the framework needed for this basic qualitative research, with a primary focus on mathematics teachers' implementation practices with underachieving student outcomes. This study was grounded in Dewey's experiential learning theory of mathematical teaching, learning, and implementation practices and processes. This research was also grounded in practices of collaboration, reflection, and evaluation of teachers' knowledge and implementation of the Eureka Mathematics Curriculum content. The information collected was derived from concurrent online databases, peer-reviewed articles, bibliographies, research books, and journals. These resources were gathered from The Walden Library, Google Scholar, Sage Premier, and dissertations via ProQuest. I discovered sources relative to the implementation practices of the mathematics curriculum to improve mathematics outcomes.

Conceptual Framework

Dewey's experiential learning theory (Dewey, 1938) guided this research with a focus on gathering the teaching and learning needs for an active support cycle (Do, Review, and Plan) with the implementation of new concepts (Dewey, 1938). The experiential learning theory was a socially constructed approach used to obtain knowledge from the experiences of others. Experiential learning theory is used to explain the role of experience within the learning process. With the incorporation of teacher interviews, I was equipped with the details of the interactions with mathematics curriculum and instruction as well as the student achievement outcomes. The acquisition of this knowledge provided me with content suited for the framework needed to discover the implementation practices of a mathematics curriculum to improve student outcomes.

This district has provided Eureka Mathematics Curriculum training for its mathematics teachers along with access to paper-based and electronic implementation guides. The detailed experiences of teacher implementation practices guided the purpose of this research to discover the practices utilized to improve student outcomes in mathematics. The insight gained into how the Eureka Mathematics Curriculum implementation and training both supported and hindered teaching practices may help to improve student outcomes. Participants who reflected on their craft provided substantial knowledge of the current benefits and challenges of implementing the Eureka Mathematics Curriculum. This research may lead to improved student success through collective teaching skills and strategies applicable to every classroom.

Dewey (1938) identified the need to make connections between content and the learning process. The knowledge of teacher actions with the implementation of Eureka Mathematics Curriculum activities helped to identify adherence to the content and the design of the scaffolded structure as a form of evolution in knowledge (Wen, 2018). Dewey's ideas were based on the teacher's ability to reflect and support learners in acquiring knowledge on complex topics with structured content (Ireland & Mouthaan, 2020). The experiential learning theory aligned with this qualitative research that explored teachers' implementation practices of the Eureka Mathematics Curriculum to improve mathematics outcomes and the alignment to the acquisition, depth, and storage of ideas.

Dewey's experiential learning theory supported the development of leadership work and goal-setting measures within teacher teams. These reflective practices helped to identify a need within the environment and designed an action plan to invoke positive changes to address the need. Based on the data, I was able to ascertain how teachers operated in the role of classroom leaders and used practices and collaborative methods to revise and revamp implementation. Teachers' practices with the Eureka Mathematics Curriculum were used to inform and enhance professional practices and student outcomes.

This enhancement of practices correlated with Dewey's experiential learning theory as well as the teachers' reflection of practices, both individualized and collaborative, on the needs of the audience. The Eureka Mathematics Curriculum training was inclusive of real-world problems that helped to make mathematics content relatable.

Some educators believe having an improved format of inquiry-based problems will lead to increased performance measures. Therefore, teachers utilized the concepts for opportunities to infuse real-world inquiry lessons into the curriculum to better support the pathway to independent learners.

Teachers have attempted to incorporate or extend real-world inquiry with the problem sets, homework, and exit tickets from the Eureka Mathematics Curriculum to support mathematical concepts and applied skills within the instructional design. Real-world applications with curriculum implementation aligns to Dewey's experiential learning theory. Dewey's experiential learning theory aligned with the purpose of this basic qualitative study, which was to discover the implementation practices of teachers with the Eureka Mathematics Curriculum to improve student outcomes at XYZ Elementary School. Dewey's experiential learning theory was used to address the strategic practice of utilizing experiences and reflectional practices and gathering insights into teacher implementation practices with the Eureka Mathematics Curriculum.

The guiding research question that was conducive to this basic qualitative research was connected to the professional implementation practices of mathematics teachers in this urban elementary school. Qualitative researchers, according to Merriam (2009), seek to answer questions about the experiences of people and their interactions. In accordance with questioning in qualitative research, Creswell (2014) promoted the inclusion of a central or guiding question. The inclusion of a central or guiding question met my desire to help readers quickly identify the purpose of a study (Creswell, 2014).

A guiding question offered this research a platform to obtain the details of the implementation practices of the participants with the Eureka Mathematics Curriculum. Therefore, the guiding research question for this project study was, how do teachers implement the Eureka Mathematics Curriculum? To achieve a more comprehensive study, sub-questions that generated high-quality outcomes were utilized. Creswell and Guetterman (2019) shared the importance of understanding the experiences of people to develop an in-depth outcome. In the attempt to be comprehensive, the sub-questions were designed to further discover the concerns and resources needed to improve or maintain the implementation practices of the Eureka Mathematics Curriculum. The answers to the guiding research question and the sub-questions addressed the problem that despite teachers' implementation of a research-based curriculum, students at XYZ elementary school have underperformed on mathematics standardized tests for the past 5 years.

Review of The Broader Problem

The basic qualitative research problem of this research was that despite teachers' implementation of the Eureka Mathematics Curriculum, students at XYZ elementary school have underperformed on mathematics standardized tests for the past 5 years. The purpose of this basic qualitative study was to discover the implementation practices of teachers with the Eureka Mathematics Curriculum to improve student outcomes at XYZ elementary school. This research was guided by the themes and concepts related to mathematics professional development, best mathematical practices, and student mathematics outcomes or achievement. The literature review provided the framework needed for this basic qualitative research. I explored sources relative to the following

themes: (a) mathematics curriculum, (b) mathematics best practices, and (c) mathematics student achievement outcomes.

For centuries, all stakeholders concurred that researched-based instructional materials and supports were vital to the success and implementation of mathematical academic content and proficient student outcomes. Ozkaya and Karaca (2017) stated there was a need for effective instructional materials, strategies, and support to help facilitate the teaching and learning processes. Teacher implementation of curricula was more effective if supplemented with hands-on activities, manipulatives, and/or intervention guidance. The authors compared two implementation groups of students. The first group was taught mathematics according to the district curriculum, and the other group with supplemental materials and intervention practices. Based on the results, the group with infused implementation practices showed better attitudes and outcomes (Ozkaya & Karaca, 2017).

According to the results of Ozkaya and Karaca's (2017) study, the improved attitudes and outcomes towards mathematics were higher in the group with infused implementation practices, such as web 2.0 tools, peer-led activities, and art integration alongside the curriculum adopted by the district. The research showed that success can be accomplished with improved implementation strategies and by the incorporation of supplemental instructional materials and/or intervention practices. Koedel and Li (2017) corroborated the importance of providing teachers and students with an equitable, high-quality curriculum for use in the mathematics classroom. The authors also noted the benefits of alterations in timing and skills within curricula that addressed the needs of the

intended audiences. Koedel and Li mentioned a need for revised policies for flexible curriculum for the audiences if or when success is problematic. Concurrently, researchers such as Bas and Sentürk (2019), Ireland and Mouthaan (2020), Partelow and Shapiro (2018), and Pellegrini et al. (2021) supported implementing research-based curricula to meet the needs of all learners. Bas and Sentürk (2019) addressed curriculum implementation and development through teachers' perceptions.

Bas and Sentürk (2019) described the disconnect in district needs, policy, and the actual curriculum selection processes. The implementation practices should be flexible and supported with built-in features for extension, engagement, and remediation as needed (Bas & Sentürk, 2019). The findings of this research determined that the selection and implementation of any curriculum or its supplements should be reflected in the demographics of its student audiences and supported with teacher training (Bas & Sentürk, 2019). Ireland and Mouthaan (2020) studied the need to provide alternative implementation strategies that infuse other content areas within its design. The results revealed the connections of STEM and its benefits within the implementation and design of curriculum supports and structures.

Bas and Sentürk (2019) argued and supported Bruner's theory of scaffolding and the impact that flexibility and diverse implementation practices had on instruction and student outcomes. Partelow and Shapiro (2018) revealed the many challenges districts faced in the quest to secure a research-based curriculum in mathematics. The results showed that the design and usability of a research-based curriculum still presented one problem: available teacher resources. They also indicated a lack of evidence of data-

driven success with implementing research-based curricula and high-yielding student outcomes. The implementation of a high-quality curriculum was beneficial and high yielding when the resources and supports for the curriculum were available (Partelow & Shapiro, 2018). Pellegrini et al. (2021) supported the concepts of improved implementation with intervention and tutoring practices in mathematics instruction. This study examined 66 curricula in K–5 schools and determined that those with built-in support measures of professional development for teachers and tutoring for students were the most successful programs.

The researchers noted the need to offer research-based curriculum options for mathematics instruction as a strategic tool to improve student outcomes. Further, the need to examine the quality and effectiveness of adopting a mathematics curriculum that was unsuccessful over time (e.g., Eureka Mathematics Curriculum) remained a country-wide challenge (Dwiggins, 2019). The challenge with the Eureka Mathematics Curriculum was evident in the low national and global rankings of the U.S. mathematics achievement data trends (The Nation's report card, 2019).

In contrast, other experts revealed that a more creative approach outside of the research-based curriculum and implementation of teaching and learning mathematics skills showed increased proficiency levels in student outcomes. Student proficiency levels were defined by the mastery or achievement levels of a learner on skills gathered from assessment data. Researchers have revealed that the classroom environment and student relationships with mathematics and/or teachers impacted student learning and achievement more than the curriculum itself. Yurniwati and Hanum (2017) believed

effective mathematics instruction and implementation were based on the environment, and human mathematical interactions created a more significant acquisition of mathematics skills (Yurniwati & Hanum, 2017). Yurniwati and Hanum detailed the three cycles of learning implementations with improved outcomes. The combination of observations and discussions, knowledge acquisition, and guided discovery learning positively impacted student learning outcomes. The authors analyzed the classroom actions that supported these three implementation cycles and their successful impact on mathematics outcomes for students based on assessment data. Maasz (2019), Bartolini and Martignone (2020), Kaminski and Sloutsky (2020), and The President and Fellows of Harvard College (2019) contended that combined practices were beneficial to the implementation of mathematics.

Maasz's (2019) research revealed a correlation between the positive impact on student success with the implementation of methods for knowledge acquisition, teacher and student-related beliefs, and attitudes toward mathematics. The combined efforts, including observation of student behaviors and learning processes, proved to guide the relationship of knowledge, ability, and application in mathematics performance. Bartolini and Martignone (2020) suggested student achievement increased with the paired implementation of manipulatives, computer gaming, and computer activities or resources. Teachers enhanced mathematics implementation strategies with hands-on student learning practices that supported an increase in student achievement. These additional supports implementing mathematics concepts made them more tangible for elementary students to grasp skills and concepts. Kaminski and Sloutsky (2020) found student

success with arts integrated mathematics instructional implementation. The authors infused creative arts into the mathematics curricula. This strategy provided learners with visual and problem-solving techniques that enhanced engagement and conceptual knowledge (Kaminski & Sloutsky, 2020).

The President and Fellows of Harvard College (2019) suggested that practices of hands-on discovery, problem-based inquiry, real-world infusion, and visual and music arts integration were high-yielding supplements to any curriculum and were areas worth examining. Harvard's research followed instruction and curriculum implementation in six states for over 3 years to determine that supplemental texts and integration of discovery and the arts positively impacted student achievement (The President and Fellows of Harvard College, 2019). The use of a researched-based mathematics curriculum involved an examination of the implementation of the mathematics curriculum practices and the impact on student outcomes (Raisinghani, 2018).

Mathematics Intervention & Best Practices

Best practices in mathematics curriculum implementation include varied designs and approaches that reflect significant student growth (Hill et al., 2019). Teacher mathematics interventions use best practices that provide high-yielding results for most teaching and learning communities (Dumas, 2019). Consequently, teacher mathematics interventions are inclusive of a review of student data to identify key skills and standards that require remediation or acceleration with a devised plan of action. This practice of identifying key students and skills to remediate or accelerate was referred to as "targeted intervention" (Dietrichson et al., 2017). Some researchers have indicated that high

student achievement is possible in America for low-income students when supported with targeted mathematics interventions. This research gauged how effective targeted intervention was for mathematics implementation. Teachers' experiences helped to further prove or disprove this intervention strategy to be a best practice for success in student achievement based on low-income and low-performing reading and mathematics assessment data (Dewey, 1938).

Researchers have established the benefits of effective best practices and intervention strategies to restore prerequisites in mathematics that were encountered in the elementary years (Dietrichson et al., 2017; Dumas, 2019; Moser et al., 2017; Park & Datnow, 2017). Additionally, research has revealed an implementation of web 2.0 tools, small group instruction, reteaching, STEM, art integration, real-world application, and peer coaching as some of the best practices teachers utilized (Dietrichson et al., 2017; Dumas, 2019; Moser et al., 2017; Park & Datnow, 2017).

In contrast, reseachers have further aimed to address the gap in policy reforms of utilizing teacher data to guide instructional decision-making and determined that the exclusion of the teacher's voice in practice and the use of interventions or strategies were not beneficial to any curricula or policy. Some researchers identified the need to discover teacher implementation practices, logic, and patterns utilized to improve student outcomes (Moser et al., 2017; Park & Datnow, 2017). These studies revealed that small group instruction and independent work infused with daily instructional practices brought student success. This study helped to discover the impact of teacher implementation practices with intentional small-group instruction on the deficits and skills that were

identified through data analysis. This research in connection with previous data relative to teachers' experiences with best practices and applied mathematics intervention guided professional performance, which supported teaching and student outcomes in mathematics (Dumas, 2019).

Some researchers disagreed with the effectiveness of standards-based instruction (i.e., teaching students to think) versus inquiry-based instruction (i.e., giving students ownership of learning concepts) as a best practice. Multiple authors reflected on the combined use of standards-based instruction and student-based real-world exploration as a best practice resolution to improve mathematics implementation and student outcomes (Figueiredo et al., 2018; Gravemeijer et al., 2017; Hadar, 2017; Lesseig et al., 2017; Yuanita et al., 2018). This type of research supported or disputed mathematics best practices, which should be communicated for improved classroom and instructional models. Other authors' studies revealed that inquiry-based learning helped to promote the creative thinking needed for mathematical knowledge (Ozkaya & Karaca, 2017).

Inquiry-based research also revealed the process of creative thinking and supported the application of acquired mathematics knowledge in a more practical way for its learners. Gradually, inquiry/creative-based thinking afforded the learner opportunities for practice that made learning meaningful and helped with information retention (Gravemeijer et al., 2017; Lesseig et al., 2017; Partelow & Shapiro, 2018). Additional research showed the hands-on approach to real-world and inquiry-based learning helped to make mathematics scholars more socially aware and engaged in the community. The skills obtained from these collaborative practices helped to form future job placement

tools and resources for the workforce. This collection of approaches to learning served as a best practice that yielded proficiency in mathematics and life skills. Figueiredo et al. (2018) added to this concept of inquiry with detailed benefits of student-led thinking and exploration of content. It was noted by many experts, including Dewey (1938), that students who were more actively engaged in acquiring knowledge tended to become proficient in the skills explored. This research discovered implementation practices with student-led activities, such as inquiry or real-world problems, and how they served as a best practice to improve classroom implementation and possibly student outcomes in mathematics.

Classroom implementation that generally provided tangible experiences (i.e., inquiry-based/ student ownership of learning) when content-generated innovative ideas for problem-solving and conceptual proficiency were facilitated, was found to be ideal for improved student learning. Multiple experts disagreed, stating that impactful classrooms were those with the applied practice of multiple components to enhance instructional mathematics implementation. Examining the experiences and practices of teachers that created scenarios beyond traditional paper and pencil aimed to inform best practices for mathematics instruction (Dewey, 1938). Multiple authors have explored these traditional strategies to initiate student engagement and academic ownership, offering improved quality for teaching and learning communities within the United States (Uribe-Florez & Wilkins, 2017). For example, the implementation of a multisensory location positively impacted student engagement and outcomes, and the interaction with themes and concepts provided a level of immersion that resonated with all senses,

offering meaningful retention and mathematic connections (Uribe-Florez & Wilkins, 2017). Therefore, utilizing Dewey's experiential learning theory as a foundation for examining teachers' experiences with the Eureka Mathematics Curriculum helped provide insight, develop action plans, and eliminate unsuccessful elements.

Mathematics Student Achievement Outcomes

The implementation of mathematics curricula and student outcomes showed diverse achievement results based on student demographics and implementation strategies when the same curriculum was utilized (Davis & Farran, 2018; Yurniwati & Hanum, 2017). Data trends revealed that student performance varied by their location, as rural schools gained higher mathematics achievement scores than urban schools. In some research, students across the country were making gains in mathematics outcomes (Andersson & Palm, 2017) while others struggled. For example, Pinger et al. (2018) identified the positive student outcomes made with the mathematics curriculum implementation by analyzing intervention practices and formative assessment data trends.

This research potentially discovered teacher implementation practices training, student support, and classroom management as tools utilized to gain mathematics achievement and success in American classrooms (Dewey, 1938). Mathematics experts shared that the incorporation of applied skills in small groups or remediation lessons helped to improve proficiency levels and/or achievement gains for students (Anderson, 2020; Baum, 2019; Dwiggins, 2019; Mattera et al., 2018; Suwangsih et al., 2019). Some researchers have disputed the benefits of inquiry-based learning as a best practice for mathematics implementation. The research findings of collective authors revealed that

inquiry-based learning had little to no impact on student outcomes. The implications to identify the improved skills in other collaborative skills not directly linked to achievement remained an unfounded notion (Anderson, 2020; Mattera et al., 2018; Suwangsih et al., 2019). These collaborative notions showed that mathematics curriculum implementation enhanced student outcomes, which brought more concern towards the inconsistent trends in student mathematics outcomes. The solution to this problem, according to Polly et al. (2018), may be revealed with more profound research into mathematics teachers' implementation practices.

Subsequently, some researchers have explained that other students across the nation were not making gains in mathematics outcomes. Peltier et al. (2020) identified behaviors, implementation, curriculum, and proficiency levels as contributors to student mathematics outcomes. Researchers have noted that the lack of planning and differentiation with supplemental actions of mathematics teachers negatively impacted student outcomes (Faber et al., 2018; McMahon & Whyte, 2020; Woods, 2020). The research identified the collective efforts of teacher planning and a variety of supplemental tools and resources as best practices.

McMahon and Whyte (2020) stated that a teacher's ability to know the students and master the content continued to bring the best practices of effective teaching and implementation. The authors specifically agreed that learners continued to be successful when there was continuity in content. The scaffolding in the curriculum design provided teachers and students with the best possible structure for implementation. The planned practices and activities with the curriculum once implemented led to student success.

Great Minds (2019), however, identified two instances in Florida and Louisiana where student outcomes had improved due to the implementation of the Eureka Mathematics Curriculum. These districts were characterized by Great Minds as the "Strongest Implementors" of the Eureka Mathematics Curriculum with a success rate made within 3 years of implementation (Great Minds, 2019). The implementation of the mathematics curriculum appeared to produce conflicting results in relation to student outcomes; therefore, further research is necessary to explore how this curriculum may enhance student learning. This study partially involved a closer examination of mathematics teachers' experiences with curriculum and student outcomes (Baldwin, 2019).

Implications

In conducting this study, I assumed that all teachers acted honestly and revealed factual experiences and feelings regarding the implementation practices of the Eureka Mathematics Curriculum and students' underachievement in mathematics. Teachers' professional practices generally evolved when adequately supported by a high-quality curriculum, effective training, and differentiated best practice (Horan & Carr, 2018). For this study, I sought to review the Eureka Mathematics Curriculum, best practices, professional development, student outcomes, and the future of implementing the mathematics curriculum. This study was created to inform teachers' practices on implementing the Eureka Mathematics Curriculum through professional development. The professional development addressed the gap in practice at the local urban XYZ Elementary School. A few proposed activities for this project were (a) professional development seminars, (b) teacher workshops, or (c) simulated implementation. These

interactive sessions improved the quality of teachers' implementation of the mathematics curriculum and proficiency levels of student outcomes.

Summary

Section 1 included a description of the problem that despite teachers' implementation of a research-based curriculum, students at XYZ Elementary School have underperformed on mathematics standardized tests for the past 5 years. I presented national data trends that led to the examination of teachers' experiences involving the implementation of the Eureka Mathematics Curriculum. Low proficiency levels had been identified in terms of local and national mathematics achievement data. This research-based curriculum was used for more than 5 consecutive years at this urban elementary school with a relatively stable teaching staff and student population.

State leaders and stakeholders recognized mathematics data trends involving low-proficiency student outcomes on statewide assessments. The state governor, superintendent, district CEO, local administrators, and teachers concurred that these scores were problematic. Collectively, these stakeholders expressed an urgency to identify what is required to address teacher implementation of mathematics curriculum and student outcomes. The theoretical framework utilized in this study was Dewey's experiential learning theory. In Section 2, I present the methodology utilized to complete this study.

Section 2: The Methodology

Qualitative Research Design and Approach

The purpose of this basic qualitative study was to discover implementation practices of teachers involving the Eureka Mathematics Curriculum to improve student outcomes at XYZ Elementary School. The problem was that despite teachers' implementation of this curriculum, students have underperformed on mathematics standardized tests for the past 5 years. Therefore, it was necessary to use a methodology in this study that was purposeful and involved systematic analysis. I addressed teachers' implementation practices involving the Eureka Mathematics Curriculum to improve mathematics student outcomes as well as to identify teacher concerns and what is needed to maintain and improve implementation of this curriculum. The qualitative research design was used to discover implementation practices of participants. I used Dewey's experiential learning theory as the theoretical underpinning of this study.

This section includes a discussion of the research design, approach, characteristics of the qualitative study design, selection of participants, sampling method, size and setting, data collection, data analysis, and interview protocols. I also address ethics, confidentiality, accuracy, credibility, and limitations of the project study.

The guiding research question and subquestions developed for this basic qualitative study were open-ended and objective. The purpose of these questions was to obtain participants' firsthand experiences regarding the study topic. I specifically aimed to discover the implementation practices of teachers involving the Eureka Mathematics

Curriculum at XYZ Elementary School and strategies used to support student achievement in terms of mathematics scores.

Qualitative research involves people's experiences and interactions (Merriam, 2009). By including a central or guiding question, researchers help readers quickly identify the purpose of a study (Creswell, 2014). The guiding research question for this project study was as follows:

RQ*:* How do teachers implement the Eureka Mathematics Curriculum?

To achieve a more comprehensive study, subquestions that would lead to high-quality outcomes were used. The sub-questions were as follows:

SQ1: How do teachers implement the Eureka Mathematics Curriculum to improve student outcomes?

SQ2*:* What concerns do teachers have about implementation of the Eureka Mathematics Curriculum?

SQ3*:* What resources do teachers need to improve or maintain implementation of the Eureka Mathematics Curriculum?

Description of Qualitative Research Design

This basic qualitative research design helped me explore teachers' implementation practices. Lindlof and Taylor (2017) stated that basic qualitative research contributes to a more comprehensive discovery of teachers' implementation practices.

Justification of Research Design

The basic qualitative design was ideal for this research because it was most beneficial to obtain data via direct interviews with participants. Other qualitative research

types, namely ethnographic research, grounded theory, phenomenological, narrative, basic, and case studies, were not aligned with this intended research.

Ethnography Study

Ethnography is used by researchers when they want to address cultural aspects and environments over a period to gather data. Lodico et al. (2010) stated that ethnographers focus on "the interactions of individuals or small groups in specific settings, ethnographic researchers tended to investigate how a larger society influenced interactions in a cultural group" (p. 15). Ethnography is useful and practical when designed for larger populations. Ethnography involves observations from the perspectives of participants in a study (Creswell & Guetterman, 2019). Ethnographic qualitative research was not considered for this research due to its cultural implications over time. I did not address any cultural impact or norms at any time.

Grounded Theory

Grounded theory could not be applied to this research due to its intended procedures and outcome to develop an actual theory from data sources (Merriam & Tisdell, 2016). Grounded theory requires the researcher to construct a theory of action and interaction as supported by participants' perceptions (Creswell & Guetterman, 2019). In grounded research, researchers use data to build a theory from narrative (Lodico et al., 2010). Therefore, I excluded grounded theory for this project study.

Phenomenological Study

Creswell and Guetterman (2019) shared phenomenological studies articulate the similar meanings of a group of individuals' lived experiences with an identified

phenomenon. This type of qualitative research is used to make conclusions about the researched phenomenon based on the individuals' lived experiences. This project study gathered data about the "practices" of participants but was not conducted for an extended period. Therefore, the phenomenological research method was not appropriate for this project study.

Narrative Study

Narrative research designs are used when a researcher's purpose is to draft, compose, and share a narrative of a participant's lived experiences (Creswell & Guetterman, 2019). The narrative approach is used to create a story of a participant's life in a specific setting or context (Lodico et al., 2010). Gathering and sharing the experiences of participants' lives and the understandings encountered are traits of a narrative study (Creswell & Guetterman, 2019). The narrative research design was not appropriate for this study because I did not seek to retell the experiences of mathematics teachers in a timeline.

Case Study Design

Case studies were also not suited for this research. Researchers who utilize case studies rely on multiple data sources for a particular focus area, which did not align with the purpose of this study (Yin, 2018). Creswell and Guetterman (2019) also noted that case studies could be applied in some qualitative research when acquiring a comprehensive understanding of organizations or systems. Case studies usually focus on small groups in a confined setting (Lodico et al., 2010). Specifically, I discovered the implementation practices of five mathematics teachers in XYZ Elementary School but

did not gather multiple data sources. This research only engaged in the comprehensive understanding of participant interviews and was not inclusive of any other data sources. Additionally, a case study was not well suited due to the generality of a teacher-based problem rather than that of a particular institute (Lodico et al., 2010). Therefore, the case study design was not appropriate to use for this study. The basic qualitative research design was the best selection to discover the implementation practices of teachers with the Eureka Mathematics Curriculum at XYZ Elementary School.

Merriam (2009) defined basic qualitative research as a derivative of constructionism and symbolic interaction for researchers interested in how people interpret, construct, and define experiences. For this type of research, researchers attempt to discover how people make sense of their lived experiences. Basic qualitative research allowed me to uncover in-depth examination of techniques, training, implementations, and strategies to help inform lived experiences (Worthington, 2013). The detailed first-hand inquiry and contributions of mathematics teachers and their experiences helped to inform the educational transformation that was needed in this research (Worthington, 2013). Therefore, the basic qualitative research design was the best choice for this research to help me to discover the implementation practices of teachers with the Eureka Mathematics Curriculum at XYZ Elementary School.

Characteristics of Qualitative Research

The qualitative research design was the methodology best suited for the practice and processes of this research study. Qualitative researchers aim to study a phenomenon within a natural setting while gathering interpretations of its effect on participants' lives

(Denzin & Lincoln, 2011). My interactions with the participants in a natural environment provided the opportunity to apply the qualitative research approach. The act of data acquisition and obtaining meaning from interviews utilizing the basic qualitative research's purpose was to discover the implementation practices of teachers with the Eureka Mathematics Curriculum at XYZ elementary school. The supporting criteria for utilizing qualitative research in this study was as follows:

- The participants' lived experiences help to explore the problem within the research (Lodico et al., 2010).
- Qualitative researchers are considered the primary instrument in the inquiry of the data (Ravitch & Carl, 2020).
- Purposeful sampling- having participants with knowledge or experience in the purpose of the study (Creswell & Guetterman, 2019).
- The researcher's symbolic interest in the construct and interpretation of the experiences of the participants (Merriam, 2009).

Participants

XYZ Elementary School was the local setting of this research study. A detailed explanation of the plan of selection, justification, ethical protections, and the relationship with the researcher are outlined in this subsection. Creswell and Guetterman (2019) explained having participants in their natural setting helps to acquire a thick description of the study and its setting. The planned alternatives, rejections, or withdrawal processes were developed and indicated in this section for explicit protocols and expectations throughout the research and interview processes.

Criteria for Selecting Participants

The anticipated participants for this study included a voluntary pool of grade-level teacher leads and a mathematics instructional lead. The data points for analysis for this study were based on the individual participants (Yin, 2018). Permission for selecting and conducting this basic qualitative work was granted by the school principal (see Appendix H). This basic qualitative study utilized the realist sampling method to generate volunteer participants who had experience with the research phenomenon (Ravitch & Carl, 2020).

This study was relative to a mid-Atlantic region's urban XYZ Elementary School (Maryland State Department of Education, 2020). XYZ Elementary School serves a total of 600 students and supports approximately 70 staff members inclusive of 30 teachers, 2 administrators, and other instructional and noninstructional support staff (Maryland State Department of Education, 2020). XYZ Elementary School was the selected site for this research due to the problem that despite teachers' implementation of a research-based curriculum, students at XYZ Elementary School have underperformed on mathematics standardized tests for the past 5 years. Based on the trending data from The Maryland State Report Card, on average, only 24 % of the XYZ Elementary students were proficient in mathematics testing for the past 5 years (Maryland State Department of Education, 2020).

Approximately 20 teachers instructed the estimated 540 students at XYZ elementary school in grades K–5 (City Public Schools, 2020). Creswell (2014) and Bullock (2013) noted a population is a group of individuals with similar traits, which was true for the pool of participants selected. These grade-level teachers met bi-weekly to

discuss, plan, and review student progress and professional practices. The voluntary participation of teachers was based on the following criterion: (a) they must have current state teacher qualifications and licensures, (b) they must have current knowledge of the state standards, and (c) they must have taught mathematics for 3–5 years at XYZ Elementary School, and (d) they must have 3–5 years of experience with student outcomes in mathematics. The selection criteria helped to secure a rich participant selection for the validity of the research (Lodico et al., 2010).

Justification of Participants

In this basic qualitative research, a small number of participants was selected based on their professional experiences with teaching and facilitating mathematics over time. Creswell and Guetterman (2019) wrote that small sample sizes contributed to higher quality inquiry for the research. A total of five participants (three of whom were grade-level team leads) were utilized to obtain data for this research. According to Ravitch and Carl (2020), the role of the researcher is supported by the design and limitations of a project, including determining the sample size. These experts further noted that there are no set rules for sample size or having a "certain" number of participants (Ravitch & Carl, 2020). For the purposes of this study and due to the restrictions of COVID-19, examining five participants was practical for the student audiences they currently serve (City Public Schools, 2020). Examining more than 20 participants was not feasible, nor would it provide the in-depth inquiry desired for the research.

Access to Participants

Access to the participants in this research was contingent upon approval from research stakeholders. Once approval was granted by Walden University's Institutional Review Board (IRB) and principal leaders, I recruited the anticipated voluntary pool members via a publicly posted electronic mail (see Appendix B). Electronic mail invitations were issued to select mathematics teachers of XYZ Elementary to generate a volunteering pool. The anticipated selection of 20 teachers included the grade-level teacher leads and a mathematics instructional lead. The willing participants were provided with the informed consent document with details and contact information regarding roles and protocols (see Appendix C).

In the event of rejections, invitations were extended to one mathematics teacher per grade level. I began the research once I had obtained the confirmed consent from the first five participants. If acceptance was low or participants withdrew, I extended invitations to any grade-level mathematics teacher. In the event that saturation was not reached with five participants, I would utilize the desired 10 participants from the selection pool.

Researcher/Participant Relationship

The privacy and confidentiality clause of this study was executed upon establishing appropriate authorizations. Upon approval from the IRB, I made initial contact with the anticipated participants. The participants and I worked within the same school district; however, they have not interacted with me (Creswell & Guetterman, 2019). My roles within the district included a classroom teacher, grade-level team leader,

mentor teacher, and instructional leadership team member. I ensured an open and unbiased demeanor that aimed to foster a welcoming atmosphere. These continued interactions led to the establishment of professional rapport with the anticipated participants (Lodico et al., 2010). I consistently provided renewed understandings of privacy, confidentiality, protocols of roles, and expectations while explaining that participation was voluntary, and participants could choose to withdraw at any time.

Target Population

The target population for this project study was based in an urban elementary school in the mid-Atlantic region. XYZ Elementary School has served an average of 600 students every school year for the past 5 years (City Public Schools, 2020). The anticipated selection of the 20 teachers included the grade-level teacher leads and a mathematics instructional lead at XYZ Elementary School. Creswell (2014) and Bullock (2013) stated a population should have similar commonalities, like the general educators at this urban school. I obtained the name listing of educators from the school's directory and proceeded to contact the teachers via email for participation (see Appendix B). The participants were selected based on their professional experiences with teaching and facilitating mathematics over time. The voluntary participants received the state-mandated training and certification measures needed to be actively employed with any district. These participants were further selected because of the trending and current role in mathematics instruction at XYZ Elementary School.

Sample Method

According to Ravitch and Carl (2020), realist sampling is defined as a sampling strategy that investigates ideas through the engagement of participants who disclose examples of personal interactions with a researcher. The realist sampling method was used to select participants and provide insight into the teachers' lived experiences and mathematics implementation (Ravitch & Carl, 2020). The realist sampling method was applied by inviting 20 mathematics teachers, including a mathematics instructional lead at XYZ Elementary School. The initial contact began in the form of an electronically mailed invitation along with the informed consent forms. The formal invitation detailed the study's confidential and voluntary nature and their anticipated roles as participants (Creswell & Guetterman, 2019; see Appendix C). The anticipated participants were made aware that their identities would be hidden with an alias for added protection from identity breaching (i.e., Teacher A). The participants were also made aware that their data would not and could not be used as an evaluative or punitive tool in any way. The anticipated participants were informed that all data were stored on password-protected devices not owned or monitored by the district.

Sample Size

The anticipated selection of the 20 teachers included the entire general educational staff. The 20 staff members taught all subject areas and were inclusive of each grade-level team lead and one mathematics instructional lead at XYZ Elementary School. According to Creswell (2014), only a few individuals or few cases need to be studied in qualitative research. Ravitch and Carl (2020) discussed the limitations in terms

of sample size and the design control of the researcher in qualitative work. This research met its limitation with five participants in its sample size. Lodico et al. (2010) stated purposeful sampling is commonly used in qualitative research and is applicable to this participant pool. In the event of rejections, invitations were extended to one mathematics teacher per grade level. If saturation occurred, the voluntary pool consisted of the grade-level teacher leads and the mathematics instructional lead. Therefore, the small number of participants utilized in this basic qualitative research further supported Creswell and Guetterman's (2019) notion that it is common to study a small number of individuals.

Setting

The setting was a mid-Atlantic urban elementary school that services approximately 600 students (Maryland State Department of Education, 2020). The demographics of this school were 93% African American with 7% mixed races/unknown (Maryland State Department of Education, 2020). Fifteen percent of students have disabilities, and 53% receive free and reduced meals (Maryland State Department of Education, 2020). XYZ Elementary School had a full-time schedule, and its students participated in all major subject areas, including English language arts, mathematics, health, social studies, and science (Maryland State Department of Education, 2020). This school offered resource instruction in the subject areas of library, music, physical education, and art (Maryland State Department of Education, 2020).

Ethical Issues and Confidentiality Agreement

Before beginning my research, IRB and district approval were issued for compliance. By ethical research protocols, all participants were made aware of their

intended roles before each interview. Each participant's role and rights were reviewed and maintained, as was noted in the informed consent forms (see Appendix C). All data or naming indicators were altered to remove any identifying information for improved confidentiality. The participants were reminded of the purpose of the study, confidentiality, and security measures for all data collection processes. During the interviews, mutual respect was present from all participants and researchers with shared experiences and feedback (Creswell, 2014).

Once the participants were identified, the interviews ensued. The participants and I confidentially engaged in the interview process utilizing an offsite location. The participants established the scheduling and location information for the interviews. I conducted all interviews using protocols outlined in the informed consent documents, which were reviewed before each interview. The interview protocols included an adherence to confidentiality followed by a concise review of the study's purpose and a synopsis of how the results were used. I recorded the interviews and took notes as the semi-structured, open and closed-ended questions were administered.

Data Collection

Data collection set the boundary for improved quality of the security and privacy measures for this basic qualitative study. The data were collected from semi-structured, open-ended interviews with the applicable recording and research protocols (Creswell & Guetterman, 2019). Qualitative researchers gain an accurate and comprehensive understanding to discern meaning from each participant (Lodico et al., 2010). Recordings

aided in acquiring precise information for analysis, coding, matrix development, and review processes.

Justification of Data Collection

I invited the anticipated voluntary pool members via email. Email invitations were issued to select mathematics teachers of XYZ Elementary from Grades K–5 to generate a volunteering pool (see Appendix B). The email indicated the proposed schedule for interviews to be conducted based on participant availability. The interviews applied the practice of mutual respect from all participants and researchers with shared experiences and feedback (Creswell, 2014; see Appendix D). The anticipated selection of 20 teachers included the grade-level teacher leads and a mathematics instructional lead. The personal experience interviews provided by the voluntary participants served as the appropriate content needed to discover the individual and collective experiences of teachers with the Eureka Mathematics Curriculum. The feedback was utilized to code themes and implementation practices to help examine the problem that despite teachers' implementation of a research-based curriculum, students at XYZ Elementary School have underperformed on mathematics standardized tests for the past 5 years.

Data Collection Instruments and Source

The data collection instruments and sources contained protocols for interviews. The application of these methods aids in providing rich and authentic experiences in interviews (Bryman, 2006). The data collection instruments included a semi-structured interview with open and closed-ended questions to ensure validity and provide opportunities for detailed examples when applicable (see Appendix D). The data

collection source that was used was a researcher-created, semi-structured, open and closed-ended questions response sheet, which contained a series of semi-structured, open and closed-ended questions to obtain more authentic responses.

Creswell and Guetterman (2019) stated that a combination of semi-structured, open and closed-ended questions provided an opportunity for gathering more specific information from participants. The collection of questions aimed to further support the context of Dewey's (1938) experiential learning theory in acquiring and targeting themes of teacher practices and experiences with curriculum implementation. These first-hand encounters supported meaningful feedback and input from participants. The incorporation of semi-structured, open and closed-ended questions provided more detailed information with a smaller chance of ambiguity (Creswell & Guetterman, 2019).

Interview Protocol

The interview protocol for this research was conducted according to the ethical and confidentiality expectations of qualitative research guidelines. The participants that agreed and signed the consent form received an email to acknowledge their acceptance and offered the next steps for scheduling the interview (see Appendix F). The participants and I confidentially engaged in the interview process utilizing an offsite location. The participants established the scheduling and location information for the interviews. All interviews were conducted using protocols outlined in the informed consent documents, which were reviewed before each interview.

The interview protocol contained semi-structured, open and closed-ended questions (see Appendix D). According to Creswell and Guetterman (2019), one-on-one

interviews allow educators to share their perceptions of experiences without judgment or fear from their peers. The interview protocol was initiated with an overview of the study, along with a review of the consent form, confidentiality expectations, and the roles and responsibilities of the researcher and participants (see Appendix C). All participants were given an alias to maintain confidentiality, and any identifiers throughout the process were removed (Triola, 2012). All interview responses were recorded on a nondistrict, password-secured device. The notes from the interviews were taken and transcribed onto a secured laptop to ensure the security, accuracy, and validity of the data.

Data Collection Sources

The data collection source that was used was a researcher-created, semi-structured, open, and closed-ended questions response sheet, which contained a series of semi-structured, open and closed-ended questions to obtain more authentic responses. Creswell and Guetterman (2019) noted that semi-structured, open and closed-ended questions provide an opportunity for gathering more specific information from participants. The interviews were recorded to assist with coding and transcribing the data on a password-protected nondistrict device. Following ethical research protocols, all participants were made aware of their intended roles before each interview. Each participant's role and rights were reviewed and maintained as noted in the informed consent forms. All data or naming indicators were altered to remove any identifying information for improved confidentiality. The participants were reminded of the purpose of the study, confidentiality, and security measures for all data collection processes.

The participants determined when and where the interviews took place. All interviews were conducted using protocols outlined in the informed consent documents, which were reviewed before each interview. The interview protocols included an adherence to confidentiality followed by a concise review of the study's purpose and a synopsis of how the results were used. I recorded the interviews and took notes as the semi-structured, open and closed-ended questions were administered.

Sufficiency of Data Collection

Interviews were sufficient for data collection because they were infused with semi-structured, open and closed-ended questions. The combination of open and closed-ended questions aided in retrieving vital information with an opportunity to probe for further information as needed. The questions included in the interviews were specific to the problem and purpose of this research. They focused on the individual teachers' implementation practices with the Eureka Mathematics Curriculum and students' underachievement in mathematics outcomes. The added details served as enriched experiences that contributed to the validity and quality of participants' responses. The added details were sufficient due to the provision of information on implementation practices discovered for a basic qualitative study and the application within this method.

Processes of Data Collection

The information for data collection was derived from the guiding question and sub-questions administered during the interviews. All information was gathered by the researcher in real-time and recorded on a password-protected nondistrict device. I reviewed the recordings, created a transcription, and conducted an open coding and

tracking method to provide an analysis of the data. The process of member checking was used for interview transcripts, which were stored on a nondistrict password-protected device. Member checking was implemented during the interview phase of the study to support validity and credibility. Additionally, member checking was conducted after the study to further validate the findings.

Data Collection Tracking System

To effectively track the data, I used a password-protected electronic calendar and journal for interviews. I used the electronic calendar and journal to log dates and corresponding notes from interviews and interactions with participants. The themes/ categories and open coding trackers were logged in the same manner and secured on a password-protected nondistrict device.

Role of the Researcher

My role was to establish privacy and confidentiality with participants. Qualitative researchers must maintain consistent contact and connections with the participants (Lodico et al., 2010). Throughout this type of qualitative research, Creswell and Guetterman (2019) indicated the opportunities for ethical concerns that may develop because of these trusted interactions. My role was to ensure an open and unbiased demeanor with the aim of fostering a welcoming atmosphere without personal bias. These continued interactions were not impacted by the history or connections with the setting or the established relationships with participants (Lodico et al., 2010). I only represented the voice of the participants, as noted in the findings. The validity of the study was supported with member checks and participant confirmations of transcripts

from interviews. I consistently provided renewed understandings of privacy, confidentiality, protocols of roles, and expectations to provide valid data for this research.

Data Analysis

The data collection and analysis for this study were conducted confidentially and according to ethical protocols for all participants (see Appendix C). The data collected were comprehensive and transcribed along with journal notes for coding themes (Creswell & Guetterman, 2019). The purpose of this basic qualitative study was to discover the implementation practices of teachers with the Eureka Mathematics Curriculum to improve student outcomes at XYZ Elementary School.

I used six important steps to analyze the data acquired from this study. The steps were as follows: (a) preparation and organization, (b) exploration and coding, (c) forming and finding themes, (d) representing findings, (e) interpreting findings, and (f) validating the findings (Creswell & Guetterman, 2019). These analytical steps were not used in sequential order, but were utilized systematically throughout this process. The goal of these applied steps led to providing a more in-depth analysis and interpretation of the data and the outcomes of the research.

Data Analysis Process

I adhered to the approved IRB protocols and procedures while conducting the processes of data collection and analysis throughout this research. The data collected were analyzed by using open coding themes and categories. The coded themes and categories provided the patterns and trends discovered in the research for deeper analysis. I used the themes and categories that were gathered from the interview questions

designed to address the purpose of this research to discover the implementation practices of teachers with the Eureka Mathematics Curriculum to improve student outcomes at XYZ Elementary School.

This data analysis aided in supporting the context of Dewey's experiential learning theory and the reflective practices of teacher implementation. The inductive process of qualitative research denoted a gradual collection of data supported by the categorization of themes and patterns into generalizations and conclusions (Lodico et al., 2010). This categorization led to the concise development of themes to answer the research question. The purpose of this basic qualitative study was to discover the implementation practices of teachers with the Eureka Mathematics Curriculum to improve student outcomes at XYZ Elementary School.

Accuracy, Credibility, and Findings

The accuracy, credibility, and findings of this data were supported by the ethical protocols and procedures implemented by Walden's IRB. Member checking was used as an additional measure to determine the accuracy of the research findings (Creswell & Guetterman, 2019). The researcher implemented and maintained the ethical protocol measures regarding Walden's IRB and CITI training practices throughout the study. Participants were provided with the opportunity to review transcripts to clarify or confirm their responses. The final approval from the participants through member checking helps to validate the contributions made by participants during the interview protocols.

Discrepant Cases

Discrepant cases were addressed with the diligent efforts of member checking. Upon examining the information and its relevance to the purpose of this study, those items were researched, defined, and noted as not fitting into categories created for coding. The "does not fit" notation was representative of the ethical practices of accuracy and validity of content and protocol and further identified the irrelevance of the information to the intended purpose of the study. These practices, in addition to the detailed description of the data collection process, helped to maintain efficacy throughout this study.

Data Analysis Results

The purpose of this basic qualitative study was to discover the implementation practices of teachers with the Eureka Mathematics Curriculum to improve student outcomes at XYZ Elementary School. I utilized one-on-one interviews with the participants as the source of data to be analyzed. The most challenging step in basic qualitative research is analysis (Ary et al., 2018). The data interpretation in this project was essential to the analytics of the study on the implementation experiences of mathematics teachers at XYZ Elementary School. Yin (2018) suggested that the analysis process with data from interviews should be inclusive of investigations, categorizing themes, tabulating, and critically evaluating findings for the most relevant information. The following steps were taken in this basic qualitative research analysis: (a) compiled the data, (b) disassembled the data, (c) reassembled the data, (d) interpreted the data, and (e) reviewed the data to establish the conclusion (Yin, 2018).

Data Analysis Process

The semi-structured interview data for this study were collected, coded, and categorized. All interviews were audio-recorded and transcribed. The suggested processes were guided by Yin's (2018) research analysis protocols and are noted as follows:

- I gathered the interview transcript data by similarities and checked them for trends. The similarities and trends were compiled based on the repetition of keywords, phrases, or ideas expressed by participants.
- I made alignments of statements provided by participants as they related to the research questions.
- I reviewed the audio tapes and transcripts/notes to further identify and check trends and similarities relative to the theme.
- Member checking of recordings and transcripts were provided to ensure validity.

In analyzing the interview data, I was diligent in seeking out themes and trends in participants' responses. I reviewed recordings and transcriptions multiple times to label and color code the keywords, phrases, and content that were aligned throughout the participants' responses. The content data were derived from the direct focus on the research and sub-questions during the interviews. I utilized the open coding method to allow the data to reveal the most pertinent themes/categories and relative content to form the conclusions around this research. I then compared and contrasted responses to determine relationships and trends between categories. Open coding helped to formulate

the categories and themes, which were later organized into a table to offer easy access for citations if or when needed

Research Findings

The questions included in the interview protocol created equitable opportunities for participants. The teacher interview protocol was divided into two sections: (a) Teaching Profile and (b) Mathematics Curriculum Implementation Experiences. The first section offered participants the space to share the training experiences and expertise held within the instructional setting. The second section of the interview focused on the lived experiences of mathematics teachers to discover the implementation practices with the Eureka Mathematics Curriculum at XYZ Elementary School to improve student outcomes. Collectively, the interview protocol led to the discovery of the implementation practices of the participants as needed for the study.

RQ

The research question that guided this study was, how do teachers implement the Eureka Mathematics Curriculum? Participants A and B stated explicitly that they implement the Eureka Mathematics Curriculum to fidelity, while participants C, D, and E stated they do not teach this curriculum to fidelity. In alignment with the protocol, these participants provided their definition of fidelity to support their responses. Participants A and B defined fidelity as utilizing the core curriculum while adding and implementing activities and supports for the learner. Participants C, D, and E all defined fidelity as teaching the curriculum as written.

SQ1

Sub-question 1 asked, how do teachers implement the Eureka Mathematics Curriculum to improve student outcomes? Participants provided the methods and tools they utilized with the implementation of the Eureka Mathematics Curriculum. The responses were supported with examples and materials involved in their daily instructional practices with their student audiences. The comprehensive responses of the participants were summarized to help discover the implementation practices of mathematics teachers at XYZ Elementary School to improve student outcomes. For example, Participant A stated,

> I teach the curriculum and use the workbooks provided by the district to support the learning processes. This year each child had a collection of workbooks to support the content, Learn, Practice, Homework, Fluency, Problem Sets, Application problems, and Exit Tickets. I also use Zearn, Multiplication.com, and various other math websites and apps that provide math fluency practice.

Participant B shared, "I use the Eureka Mathematics Curriculum and iready Math lessons to teach my students. I add other resources to teach math too, some of them are Khan Academy, Zearn, Math Playground, and Common core Math worksheets." Further, Participant C stated,

> I teach the Eureka Mathematics curriculum and use supplemental materials and resources to add to the learning experiences. I use Embarc online, online manipulatives, Brainpopjr, Youtube, online math games, TikTok, dances, filming videos, iready, and xtramath to help my students and families.

Participant D stated, “When I am done teaching the Eureka lessons, I use many other mathematics websites. I still use sites like Freckles, study ladder, mobymax, iready, and zearn to help support my students.” Finally, Participant E stated, “I only use the Eureka math curriculum, the assigned curriculum workbooks, and the recommended activities for each lesson.”

SQ2

Sub-question 2 asked, what concerns do teachers have with the implementation of the Eureka Mathematics Curriculum? This question provided participants with the opportunity to express the concerns they have encountered with the implementation of the Eureka Mathematics Curriculum. They outlined implementation struggles and issues encountered in their instructional practices with this mathematics curriculum. The responses were summarized to identify their pertinent concerns with the district-mandated curriculum tool. Participant A shared the following:

> I do not have many concerns about this math curriculum. I only think that the lessons are too long. It is extremely challenging to teach the lessons in one math block. I think that the content is too rigorous and long for my students and their current abilities. I do not think this curriculum provides room for creativity or lends itself to incorporating other resources. I do not think this curriculum has sufficient time allotted for student engagement in other resources.

Participant B revealed,

> Sometimes I think that this curriculum is severely challenging for my students. Some of my students have major foundational skill gaps which the curriculum

seems to not address. The curriculum lacks the opportunities to teach and explore math vocabulary in meaningful ways for my students.

Participant C revealed the following:

> My concern with this curriculum is that there are too many strategies. The variety of strategies causes my students to become more confused about math. I am concerned with the lack of order or scaffolding within the structure or design of the lessons. Some of the problem sets and homework assignments seem misaligned too with the actual lessons. This curriculum does not allow time for teacher adjustments and redirection needed for some learners in the actual classroom for error intervention with the instructional process.

Participant D revealed,

> I am concerned with the gaps in developmentally appropriate concepts. Most basic skills are not reviewed or taught consistently enough for student proficiency or mastery. Even across grade levels some concepts are never seen or skipped which makes them difficult for learners to retain. I also think it is difficult to teach this curriculum to fidelity because students need prerequisites that the lessons do not account for.

Finally, Participant E revealed, "I do not think this curriculum offers enough flexibility for teaching and learning opportunities. The pacing of the lessons is too fast for my students and needs to be adjusted or stretched out."

SQ3

Sub-question 3 asked, what resources do teachers need to improve or maintain the implementation of the Eureka Mathematics Curriculum? This question permitted participants to inform stakeholders about the needs assessment based on their lived experiences. They provided details on what they need to maintain and/or improve their implementation of this mathematics curriculum. The responses of the participants were summarized to identify the gaps in tools and resources needed for effective mathematics implementation.

Participant A shared the following:

> I am pleased with the resources I currently use to implement the Eureka Mathematics curriculum (Learn, Practice, Homework, and Exit ticket workbooks). I think the district can however provide mathematics tutors for students that are below grade-level expectations. I think there should be differentiated teacher and student options within the curriculum for improved implementation and achievement. I would like to see more Intervention and home support for all students and more manipulatives. I think parents need exposure to math content and accountability for student learning and reinforcement at home. Some lessons are too long and a few components in the math curriculum could be removed or adjusted (humming counting and whispering of numbers). Instead, there should be more opportunities for children to explore math and build math inquiry practices. I need to have a more creative influence on how I can teach and

reach my students. I would like more training on how to deliver mathematics instruction more successfully and fewer testing mandates.

Participant B shared,

I need a curriculum that focuses on the whole child and not just their weaknesses. I need to know how they selected this curriculum or learn how to be a part of the process to fix it. I need a curriculum that provides real-world exploration that makes learning math fun. I need to be more knowledgeable and better trained by this district in the areas specific to me. The curriculum needs to have time to teach math vocabulary and fluency in ways which my students can understand and apply. I need to have access to training for special education students and websites that can support math lessons. I need to know how to meet the needs of the students in a realistic way that can address the foundational deficits I see every year. I need the support of families and parents with student morale, effort, and reinforcement at home. I need small group training and time to try to address the foundational gaps in my students.

Participant C shared,

I need to be able to make professional choices when needed to support the needs of the students with the curriculum. I could benefit from additional training on areas that I might struggle with or remediating skills my students can't master. I need to have time to conduct small groups or personalized learning considerations. I need the curriculum to have alignment and consistency that promotes time for mastery or proficiency. I could also add that I need parents to

have more knowledge of the skills being taught so that they can be a better support system for their children at home. I need the district to reinstate homework as a component of the grading policy. I will need to use skill workbooks and web 2.0 tools to make a bigger impact on my students. Additionally, I need the support of family members and district leaders.

Participant D offered,

I need time to teach, time to conduct interventions, and small groups. I need a curriculum that has the time built in to correct and lead to skill mastery for remediation and acceleration. I need the curriculum to have the time built-in and content with real-world problems or project-based opportunities that help to make these match concepts more concrete for elementary students. I need time in the bath instructional design or block to include peer tutoring, computer-assisted learning, and intervention. I need time for parent workshops to help teach home and community members these skills and strategies for the "New Math" so that they can guide their children when they are not in school. I need actual math tools and manipulatives to help with hands-on practice for some lessons (scales of different types, assorted measurement tools, etc). Most of all I need my voice to be heard when the decisions are being made on content and curriculum ideas within this district. I need stakeholders to know that I feel unsupported and restricted in making the necessary adjustments or changes to the scope and sequence as needed for my students.

Finally, Participant E shared the following:

I need the district and curriculum to be more flexible (differentiate in all ways) as it relates to the needs of all students and their learning levels (special education students). I need the curriculum to focus more on the skills that are useful for the real world while providing opportunities for small-group instruction. I need the pacing to be flexible so that it allows time and continuity for learners to gain some level of proficiency before learning something new and unrelated. I need options to extend to students and families that can assist with teaching and learning beyond the classroom. I need the system to allow homework again so that students can get practice even at home. I need materials, place value disks and charts, thermometers, counters, calculators, and other math tools to help facilitate the lessons while engaging the students.

Table 5 presents examples of open codes, while Table 6 depicts examples of open codes and categories.

Table 5

Examples of Open Codes

Code	Coding Key	Participant	Excerpt/Phrase/Keyword(s)
Professional Development	PD	C, D	"Differentiated Teacher Training for my specific needs"
		A	"How to make it happen in the math block?"
			"More teacher training is needed"
		B, E	
Time and Flexibility	TF	A	"More time is needed for implementation and practice"
		B	"I don't have enough time"
		C	"It's too much content for one lesson…"
			"How do they expect it all to fit?"
		D	"I need more time to teach math.."
		E	
Curriculum Alignment Tools	CAT	E	"Hard to find quality resources to reinforce and match the content"
		D, A, B	"I use the resources and materials that I have been using for years…."
		C	"They need more practice with skills…"
Student Achievement Gaps	SAG	B	"Intervention and small group centers are helpful…"
			"My students are far behind in math"
		A, C, D	"Intervention programs are needed"
		E	
Stakeholder Roles	SR	D, A, C, B	"Parents need to be involved"
		E, A, C, B	"District leaders need to see real math classrooms in action.."

Table 6

Examples of Open Codes and Categories

Category	Code	Participant	Excerpt Phrase/Keyword(s)	Frequency
Tools, Equity & Resources	Curriculum Alignment tools & Resources	A, B, C, D, E	"….resources and materials to help."	47
	Time and Flexibility	A, B, C, D, E	"More time to/for"	35
Stakeholders in Mathematics	Stakeholder Roles	A, B, C, D, E	"Teachers should/ are …."	18
			"Parents can/ need.."	
			"District should/ are.."	10
			"Students can/ should/ need…"	21
			"Communities should/ can…"	22
				6
Teaching and Implementation	Professional Development	B, D, C, E, A	"Training on/ with…."	42
	Time and Flexibility	A, B, C, D, E	"More time to/for"	35
	Student Achievement Gaps	A, B, C, D, E	"Students can/should/ need.."	22

Table 7 presents examples of categories and themes alignment for the overarching research question, while Table 8 presents the same for sub-question 1, and Tables 9 and 10 for sub-questions 2 and 3.

Table 7

Examples of Categories and Themes Alignment

Categories	Themes
Teaching and Implementation	Theme 1: Mathematics Curriculum Tools and Resources Equity, Theme 3: Improving Mathematics Teaching and Implementation Proficiencies.
Stakeholders in Mathematics	Theme 2: The Roles of Stakeholders in Mathematics Success
Tools, Equity & Resources	Theme 1: Mathematics Curriculum Tools and Resources Equity Theme 3: Improving Mathematics Teaching and Implementation Proficiencies.

Table 8

Examples of Categories and Themes Alignment

Categories	Themes
Teaching and Implementation Practices Stakeholders in Mathematics Tools, Equity & Resources	Theme 1: Mathematics Curriculum Tools and Resources Equity, Theme 3: Improving Mathematics Teaching and Implementation Proficiencies. Theme 2: The Roles of Stakeholders in Mathematics Success Theme 1: Mathematics Curriculum Tools and Resources Equity Theme 3: Improving Mathematics Teaching and Implementation Proficiencies.

Table 9

Examples of Categories and Themes Alignment

Categories	Themes
Teaching and Implementation	Theme 1: Mathematics Curriculum Tools and Resources Equity, Theme 3: Improving Mathematics Teaching and Implementation Proficiencies.
Stakeholders in Mathematics	Theme 2: The Roles of Stakeholders in Mathematics Success
Tools, Equity & Resources	Theme 1: Mathematics Curriculum Tools and Resources Equity and Theme 3: Improving Mathematics Teaching and Implementation Proficiencies.

Table 10

Examples of Categories and Themes Alignment

Categories	Themes
Teaching and Implementation	Theme 3: Improving Mathematics Teaching and Implementation and Theme 1: Mathematics Curriculum Tools and Resources Equity and Proficiencies.
Stakeholders in Mathematics	Theme 2: The Roles of Stakeholders in Mathematics Success
Tools, Equity & Resources	Theme 1: Mathematics Curriculum Tools and Resources Equity and Theme 3: Improving Mathematics Teaching and Implementation Proficiencies.

Themes in Findings

Participants' responses provided opportunities for further analysis of the data themes. The major themes that evolved were based on responses aimed to direct the nature of the study and its research along with open coding to establish categories that led to three core themes. The themes that evolved from the data are (a) Mathematics

Curriculum Tools and Resources Equity, (b) The Roles of Stakeholders in Mathematics Success, and (c) Improving Mathematics Teaching and Implementation Proficiencies.

Theme 1: Mathematics Curriculum Tools and Resources

The theme of accessibility to a comprehensive high-quality mathematics curriculum to meet the needs of learners was important for the participants. All teachers (n = 5) provided reviews on the Eureka Mathematics Curriculum and its deficits. They all agreed with the rigor the curriculum seems to provide, but struggle with the lack of equity and flexibility for their diverse urban audiences. Most of the participants were passionate about the lack of continuity of some of the most basic mathematic skills across grade levels. They identified the lack of a teacher's voice within the curriculum to allow for interventions or special education needs. All participants (n = 5) revealed a need for the mathematics curriculum to provide opportunities for real-world or project-based learning, vocabulary development, and a more focused approach to computation strategies within the implementation process.

The participants discussed the need for materials and resources to implement the Eureka Mathematics Curriculum. Some mentioned that this most recent year has been one of the few years where teachers and students had most of the components or supporting materials to facilitate the lessons. They stated that mathematics manipulatives and hands-on materials were in short supply and, in most cases, were not provided. This issue was one that the participants deemed a hindrance to learners because of the need to meet learning styles and applications for improved mathematics proficiency.

Theme 2: Roles of Stakeholders in Mathematics Lack of Success

The roles of stakeholders in mathematics success evolved as a theme for the participants due to their experiences with a whole-child focus. All participants were concerned with the mandated curriculum selection and adoption processes. Teachers revealed their lack of contributions to the adoption of the Eureka Mathematics Curriculum. They shared the collaborative idea that community leaders, districts, and curriculum developers are far removed from the evolving status of the learning climate. This detachment makes it difficult for participants to determine what curriculum is most appropriate for all learners. It was apparent to these participants that the one-size-fits-all approach does not work for their demographic of students. Instead, they hoped the voice of the teacher may infiltrate the practices and policies so that the diversity in proficiency levels and the achievement gaps can be addressed.

Theme 3: Improving Mathematics Teaching and Implementation Proficiencies

The theme of improving teacher practices with the implementation of the Eureka Mathematics Curriculum developed as a natural form of reflection. The participants shared their many years of teacher training in mathematics instruction. They revealed the progressive ways in which professional developments in mathematics have improved over the past decade. Since 2008, these participants identified the changes in common core standards alone have impacted mathematics curriculum and instructional strategies. The most recent improvements to professional development in mathematics were attributed to the COVID-19 pandemic. These teachers admitted that the accessibility of virtual training options and interactive or simulated training innovations improved their

implementation practices in every content area. Additionally, they expressed the need for mathematics teachers to participate in ongoing training that was differentiated to their specific learning needs and styles. This differentiation in professional development, in their opinion, should be mirrored and extended to the curriculum design and its selection processes and aimed to appropriately service the intended student audiences.

Salient Data and Discrepant Cases

Interviews were conducted in alignment with the conceptual framework in the study to create salient data. I reviewed discrepant cases as a means of establishing another viewpoint. A discrepant case was defined by any participant with no visible signs of evidence based on the comprehensive data. Within this process, participants were provided with my background and role in this study. To reduce inaccuracies and bias, I remained reflexive while consistent in critical self-reflection. This practice reduced any bias and predispositions regarding the interpretation of the data and this study. Conclusively, there were no discrepant cases in this research.

Accuracy of Data Analysis Procedures

Member checks are methods used to improve the validity and quality of the study (Creswell & Guetterman, 2019). This study was based on participant interviews and the findings gathered from implementation experiences with the Eureka Mathematics Curriculum. I verified the data, audiotapes, and transcriptions of all participants. The member checks corroborated the trending themes between participants' experiences obtained in interviews. The goal of this qualitative study was to understand or explain the phenomenon relatively and accurately. This ensured the establishment of a level of trust

by providing credible and transferrable findings (Merriam, 2009). Member checking was also incorporated to reinforce the validity of all reported and recorded findings. Upon completion of the data analysis, the transcription and data reports were read and reviewed by the participants for accuracy.

Summary of Outcomes

The participants in this study were open and honest in their experiences and shared detailed responses about their professional practices as mathematics instructional experts. Their honesty allowed me to review the interview analysis data collectively for deliverable measures. The participants in this study have collectively taught mathematics for an average of 25 years, while specifically teaching the Eureka Mathematics Curriculum for at least 5 years. The participants reflected on their implementation of the Eureka Mathematics Curriculum as a tool to improve student mathematics outcomes. The findings from the interview data analysis revealed the implementation variances, identified the supports needed, and confirmed the challenges of mathematics teachers in the implementation of the Eureka Mathematics Curriculum at XYZ Elementary School.

Mathematics teachers at XYZ Elementary School implemented the Eureka Mathematics Curriculum in the respective grade levels for more than 5 consecutive years. They utilized a variety of web 2.0 tools, workbooks, games, and strategies as supplemental resources to improve student mathematics outcomes. Despite the usage of a variety of resources outside of the designated curriculum, teachers mostly felt that the implementation was delivered with fidelity. The participants at this site were concerned with the implementation expectations of the mathematics curriculum. Participants stated

that the pacing and scheduling of the curriculum did not align with the needs of the student audiences. They all agreed to some extent that the curriculum was challenging and lacked the flexibility and supporting tools to meet the learning and proficiency deficits of their students. They felt that the curriculum provided rigor but lacked flexibility and differentiation for the students' needs.

The teacher participants also revealed the lack of continuity the Eureka Mathematics Curriculum offered across grade levels. They identified the curriculum's gaps in teaching mathematics vocabulary development and real-world connections as well as built-in measures for special education learners. Although teachers "designed" the Great Minds Eureka Mathematics Curriculum (Great Minds, 2019), many of the teachers were not certain whether they would refer or recommend this program to other schools or districts needing to improve mathematics outcomes.

The mathematics teachers at XYZ Elementary advocated for support and equity from stakeholders, specifically parents. According to Epstein, six types of parental involvement components may benefit the teacher-student-parent relationship (Newman, et al., 2019). The six components were all mentioned in some capacity by the participants: community collaboration, parenting practice, learning at home, communication, volunteering, and decision-making. Teachers identified the need for parents to be knowledgeable of the content and actively involved in their children's learning and achievement processes and goals. The participants believed that a collaborative interest at home and school would lead to enhanced student achievement. It

was also indicated that active parental support provides students with the added motivation needed to reinforce overall student growth.

The participants recommended that the teachers' voices need to be valued and active in the design, development, scheduling, selection, training, and evaluating processes of curricula adoption within school districts. The participants concluded that the Eureka Mathematics Curriculum is being delivered differently from one teacher and grade level to another. The teachers also identified the variables of student levels, the rigidity of the system, and the lack of prerequisites as contributors to the low mathematics achievement at this site. Participants revealed that the curriculum is being utilized in addition to other resources, making it challenging to determine if it could improve mathematics outcomes at this site. The participants further noted the importance of including accountability measures for all stakeholders to foster a systematic approach to the learning cycle. Some of those accountability measures mentioned were mandatory quarterly parent-teacher conferences, accessible parental mathematics content training, mandatory mathematics tutoring and intervention services, and revised mathematics homework policies. Teachers at this site felt that when these equitable measures are optional, the commitment to student achievement waivers, leaving the sole responsibility to the mathematics teachers. The participants acknowledged and accepted their roles and responsibility in student achievement, but also reflectively realized that student motivation and accountability were more challenging with one facilitator.

Project Deliverables and Findings

Basic qualitative research was appropriate for this study due to its authenticity and direct insight into the experiences of mathematics teachers at XYZ Elementary School. The research revealed the need for systematic responsive protocols to provide a temperature check from teachers to stakeholders. These interviews highlighted the teachers' need to feel included and heard in the decision-making processes for their student audiences. They disclosed the disconnect between the actual classroom needs and wants versus those imposed or mandated by parties who were not actively involved with the students or parents.

Teachers' voices need to be heard so that the students' needs can be addressed. Participants acknowledged the inadequacies in mathematics student achievement levels and the social-emotional inequities are a direct result of this contradiction of what is needed and what is perceived to be needed in urban schools. Local officials and district leaders should acquire more feedback from classroom teachers who are not afraid to state or advocate for what experience has taught them will work. Creating open forums, ongoing surveys, and taking the time to visit "real" classrooms with "real" conversations can help bridge the alliances needed for the effective and lasting advancement of student achievement in mathematics.

Teachers at this site welcomed the need for ongoing mathematics professional development opportunities that were relevant to the participants and current student audiences. They mentioned the desire to have real-time guidance and models of teaching strategies and practices to help inform and improve their professional skill set.

Additionally, these teachers indicated the improved accessibility to virtual training that can be accessed at will (i.e., District Sharepoint) helped them to refresh or review training practices that can further enhance the teaching and learning design. All the participants revealed the need to address the curriculum selection process. Participants advocated for the creation of a comprehensive program that can be customized to meet the diverse needs of schools and their intended audiences. The teachers stated there is a need for differentiated methods and strategies to help combat the issues connected to proficiency deficits within their classrooms, school, and district.

Section 3: The Project

The study provided insights regarding implementation experiences of mathematics teachers in an urban setting. Mathematics is a core subject area that lends itself to many opportunities for standardized testing and student achievement across the United States and the world. Improved implementation of any mathematics curriculum is essential to the comprehensive acquisition of teacher skills and student success. This urban school district has provided its teachers and students with the Eureka Mathematics Curriculum, professional development training, and Eureka Mathematics Curriculum resources to positively support effective implementation and student outcomes. Teachers at XYZ Elementary School struggled to impact student outcomes.

The project that resulted from this study was a 3-day school-based mathematics professional development seminar that was created to improve and support the implementation planning and customization of the Eureka Mathematics Curriculum. Professional development seminars are among the most comprehensive methods to systematically deliver content, train, and offer research-based guidance to mathematics teachers. This mathematics professional development seminar was designed to explore and identify best practices and resources to better develop teacher curriculum planning practices. Additionally, this may assist in the development of a mathematics instructional resource toolbox which is aimed at empowering effective implementation planning of the Eureka Mathematics Curriculum at XYZ Elementary School.

In this section, I explain in detail the mathematics professional development seminar. I discuss the purpose, goals, learning outcomes, and target audience

participating in this professional development. This section includes details regarding timelines, activities, training, and information about format of the professional development. Presentation slides, implementation, and details involving seminar successes and challenges are also included in this section.

Project Genre: Professional Development

The purpose of this mathematics professional development seminar was to improve implementation planning and customization practices of the Eureka Mathematics Curriculum at XYZ Elementary School (see Appendix A). Teachers engaging in professional development that offers planning and resource development provide active reflection and build proficiency skills that are needed to improve implementation (Dewey, 1938). Teachers engaged in a series of activities that promoted collaboration, modeling, and individualized toolbox development. The professional development incorporated Eureka Mathematics Curriculum exit tickets. Three exit tickets from three different grade levels were created and used as assessment resources similar to those provided by the district which are currently being used by the teachers at this site. The professional development series provided mathematics implementation planning, data analysis, and resource alignment web 2.0 tools for teachers at XYZ Elementary School. This series of professional development was focused on the teacher's voice in planning. Teachers' work in this series was supported via a self-created lesson implementation and customization planning sheet, self-created discussion scenarios, and samples of self-created curriculum alignment and standard mastery log sheets (see Appendix A). The planning sheet I created was designed to provide purpose and

alignment with mathematics curriculum goals, student knowledge acquisition, and skills. The comprehensive lesson planning and customization sheet was used to address impacts on teacher practice. The planning and customization sheet provided the scaffolded planning framework for intentional differentiation with core knowledge of individualized students' needs based on data trends. The planning document helped teachers to identify ways proactively to meet, group, and guide intentional instructional happenings for the diverse student audiences these teachers face daily. This comprehensive planning and customization sheet helps teachers to think professionally about student needs that are specific to the Eureka Mathematics Curriculum and state standards. The other alignment and log sheets that were created included organizational tools to help support and track profiles, content alignment, and learning competencies of students. Improvements in implementation planning because of this professional development may help to improve student achievement outcomes in this urban setting.

Project Goals

The goals in this professional development were to (a) provide a purposeful planning tool and curriculum-aligned resources to support the implementation of the Eureka Mathematics Curriculum, (b) promote continuous collaboration of mathematics teachers, (c) enhance their implementation of the Eureka Mathematics Curriculum, and (d) enhance their data analysis experiences in order to reduce the number of underperforming students in mathematics. Professional development opportunities that include real-world simulations result in more equitable outcomes for teachers and students (Greenleaf et al., 2018). Mathematics teachers at XYZ Elementary School were

exposed to scenario training, how-to resources, and simulated practices involving Eureka Mathematics Curriculum implementation to help analyze and develop individualized reflective plans for future implementation.

During the scenario training that I created, teachers selected a card that included a mathematics classroom dynamic and/or challenge involving student achievement, differentiated learning levels, or other type of classroom issue. Teachers collectively or individually identified ways they may have addressed or attempted to resolve such issues based on their shared experiences. The resulting discourse helped to comprehensively plan for intentional and flexible lessons. These practices involving reflection, discussion, and unpacking standards helped them actively customize lessons. Customizing mathematics lessons helped with actual mathematics knowledge profiles of their students. Teachers identified ways to edit their lessons based on student modalities, achievement levels, and mathematics profiles. This activity may lead to consistent practices involving implementation planning in order to attend to the needs of student audiences. Teachers collaboratively designed a resolution in the form of a customized lesson plan to address the scenario or problem based on experience, unpacking progressional standards, and combining improved ideas that were shared during sessions. They were recorded via a lesson planning and customization sheet with researcher-created video, which helped to guide work in these sessions.

Also included in this professional development were opportunities for teachers to learn how to effectively identify and incorporate curriculum-aligned mathematic tools and resources to support implementation planning for the EMC. I demonstrated in a

training video along with the sample alignment sheet (see Appendix A) how to determine which resources are aligned with the Eureka Mathematics Curriculum. Teachers had the opportunity to explore, review, and join or sign up in order to use at least two aligned web 2.0 resources. Additionally, the professional development offered experiences for teachers to actively work on impactful planning through customization to better inform teaching and learning practices for mathematics instruction.

The training sessions were inclusive of the data analysis strategy through the hands-on practice of analyzing student assessment data. The self-created video included the steps for how to use sample exit ticket data and standards alignment to plan for improved implementation and understanding of student success. Teachers collaborated to identify standards within exit tickets and chart prerequisites and built student mathematics profiles and explored the lesson progressions as major planning steps. The exploration resulted in a comprehensive view of the next steps teachers will take to acquire tools, learning content, additional supports, or resources to build their toolboxes for improved implementation. This professional development seminar equipped the mathematics teachers in this urban school with a new or renewed lesson implementation and planning practice tool, data analysis strategy, and curriculum-aligned resources to implement in the classroom setting.

The learning outcomes of this mathematics professional development were to supply the teachers at XYZ Elementary School with additional training via a planning tool that helps to identify student needs, curriculum-aligned resources, and customizable planning practices applicable to the classroom setting. Renewed training on planning and

resources is necessary for increasing teacher proficiency levels in content and instructional planning practices (Evans, 2019). Differentiated methods of teacher training and quality content infusion elevated the process and increased the likelihood of active application of taught strategies in the classroom, thus highlighting the need to have planning and data analysis activities that resemble the real work teachers undertake daily. When teachers are better equipped with realistic and relative practices, they consequently positively impact their learners while simultaneously improving their implementation craft (Kul, 2018).

Rationale

As a result of the challenges with teacher implementation of the Eureka Mathematics Curriculum at XYZ Elementary School, it was most impactful to engage in a mathematics professional development seminar. In Section 1, I explained the problem that despite teachers' implementation of a research-based curriculum students at XYZ Elementary School, students have underperformed on mathematics standardized tests for the past 5 years. After analyzing the interview data trends, it was obvious that professional development would permit teachers to further reflect on and improve their experiences with the implementation of the Eureka Mathematics Curriculum. According to Evans (2019), professional developments need to be explicit, relative, and informal to maximize effectiveness. This teacher professional development training consisted of specific ideas and planning procedures that are recommended to be followed in an attempt to guide and improve achievement outcomes. The training was based on real-life encounters with the mathematics content and provided collaborative options that are

relatable to the desired or intended audiences of the trainees. When coupled with an environment that supports interactions with real-life training conditions, the time and ideas become more meaningful for implementation. Professional development training must offer tangible experiences for teachers to buy into an application and, ultimately, change. Although teachers have received training within this district, a comprehensive planning tool for implementation and scenarios was not inclusive in this training. Tenured mathematics teachers at XYZ Elementary School depend upon classroom experiences and district-led professional developments to improve implementation planning, strategies, and student outcomes.

Mathematics professional development provides consistent interactive experiences customized for the climate and culture of XYZ Elementary School. Teachers are more engaged and responsive when professional developments provide a realistic approach to challenges and strategies specific to the setting (Evans, 2019). I designed the professional development as well as the lesson implementation and customization planning and support sheets to meet the current challenges and implementation needs of the instructional staff of this urban school. Some of these challenges include time management with mathematics implementation, access to resources and tools that help to improve and support student achievement, and teacher content proficiency levels with the current mathematics curriculum. The challenge of time management and teacher content proficiency levels with mathematics implementation can be supported with the intentional practice of lesson planning and customization. Teachers worked collaboratively to unpack standards and reflect on the assessment data of their student

audiences. Closely examining standards provides teachers with the time to identify the actionable planning guidances to achieve desired outcomes for mathematics lessons, state standards, and goals. These planning framework support sheets helped teachers to diagnose and plan to remedy the issues they might encounter proactively. Seeking out past trends, identifying prerequisites, and specifically targeting the "ask" of standards, led to the design needs for the next steps for mathematics implementation. Those parameters helped teachers to make informed decisions on how to address the students' needs and align them with the intended goals of any mathematics curriculum, including Eureka Mathematics. The other concern of resources and tools at this school was addressed by ensuring that teachers are utilizing items aligned to the content and, therefore, reinforced the mathematics skills for improved student outcomes. According to the responses of mathematics teachers at this school, teachers used a variety of resources and web 2.0 tools to help their students. One trend that was addressed was to help teachers to identify and learn how to use tools or resources that are aligned with the current Eureka Mathematics Curriculum. The professional development genre offers opportunities to effectively engage and address the targeted issue of low mathematics proficiency levels among students.

Review of the Literature

The framework utilized in this study allows for the incorporation of reflective practices and teacher training in content knowledge, which were components of the project study's professional development training. Professional development is a consistently utilized method to guide research-based teacher training within school

districts. As a result, school districts had several professional development days systematically built into the calendar to support teacher training opportunities on new and updated research. Professional development is used to deliver research-based teacher training and exposure to improved implementation practices, which are essential to address the problem faced by this urban elementary school. A comprehensive tool, like professional development, helps to provide research-based differentiated training practices and reflective activities that support the goal to improve mathematics implementation and student outcomes.

There were two key areas of the literature that were brought together to guide and support the recommendations of this professional development project study. These areas were detailed in (a) Mathematics Professional Development and (b) the Role of Technology in Professional Development. Each of these focus areas was inclusive of recent literature aimed to expose and engage implementation of best practices for mathematics instruction. A combination of peer-reviewed articles, resource books, and journals connected to the theme of this project. Sources connected to this project were found using the Walden Library, Scholar Works, and the database of Education Research Complete.

Mathematics Professional Development

The genre of professional development is applied for mathematics teachers to learn about research-based resources to improve implementation. According to Lew and Nelson (2016), teachers need to participate in training regarding new methods and resources for curriculum implementation. Over time, there were new methods and

resources developed in the implementation of mathematics partly due to the impact of the COVID-19 pandemic. However, these teachers were working with the same mathematics curriculum for 5 consecutive years and struggled with positive student outcomes. The level of student underachievement demonstrated the need to improve teacher implementation practices through professional development.

Professional development seminars offer opportunities for teachers to explore new and improved instructional practices. Greenleaf et al. (2018) mentioned the importance of incorporating teachers' prior knowledge and diverse experiences into the design of any professional development. Consequently, the previous practices, strategies, tools, and resources of teachers were explored within this professional development design. Strong (2018) supported the concept of variety when developing a professional development seminar. Professional development seminars are created to deliver a diversified approach to meet the needs of their intended audiences.

Mathematics professional development (MPD) is a systematic training structure that offers opportunities for improvement in instructional design for teachers around the world. According to Darling-Hammond et al. (2017) school districts, curriculum developers, stakeholders, and educators throughout the United States participate in various programs that aim to foster new or improved activities, content, resources, and teaching and learning practices for classroom implementation. Evidence from multiple studies revealed that MPD opportunities were offered to aid in supporting the implementation and achievement protocols and outcomes for its participants within the classroom setting (Bas & Sentürk, 2019; Jacob et al., 2017). Dewey (1938) confirmed

MPD programs can be useful for teacher experiences and must evaluate and reconnect new paradigms and relevancy of the content between teachers and students. Additionally, Polly (2018) stated that MPD helps to inform targeted problems and provide actionable resources and materials to rectify issues concerning implementation and achievement. The Nation's report card (2019) showed the issues with implementation and achievement were consistently noted in the trending decline of the national testing data. Within the United States, testing data showed an achievement contrast in mathematics, despite the continued efforts and implementation of professional development programs (The Nation's report card, 2019). The mathematics achievement levels of students recorded across this country remained problematic in this subject area (The Nation's report card, 2019).

Many researchers have positied the importance of professional development and the constant need for teacher training in mathematical pedagogy, curriculum implementation, and student outcomes. Based on the research of Horan and Carr (2018), a guided structure of mathematics instruction requires a balance of knowledge and appropriate instructional training and professional development of content skills and curriculum designs to obtain a higher quality of implementation. Collectively, Horan and Carr (2018) identified the significant differences in the professional development levels of mathematics teachers within the United States. The varying levels of professional development were relative to a teacher's ability to (a) build content knowledge, (b) participate in observations, (c) reflect on craft, (d) apply the change, and (e) share expertise with others. Researchers have determined that a teacher's expertise was

contingent upon the level of professional development acquired in addition to the number of years of service (Horan & Carr, 2018; Koedel & Li, 2017).

In multiple reputable studies, researchers have shared and discussed similar views on the importance of professional development training for teachers periodically. Researchers identified the goal of mathematics professional development was to improve the math knowledge and levels of its teachers systematically. Jacob et al. (2017) indicated MPD had four purposes that would ensure quality mathematics educator levels and favorable student outcomes over time. The four purposes were (a) mathematics teachers learned more math knowledge, (b) mathematics teachers learned how children learned mathematics, (c) mathematics teachers learned how to use formative assessments to develop insight into student mastery and needs for intervention, and (d) mathematics teachers developed effective instructional strategies for mathematics classrooms.

The continued study of professional development among mathematics authors has uncovered the importance of understanding the attitudes, proficiency levels, and beliefs of teachers in the processes of teaching and learning mathematics (Kutaka et al., 2017). Kutaka et al. unveiled the outcomes of systematic practices of teacher reflection and its impact on mathematics instruction. Most authors concurred with a system of consistent connections to support improved teacher knowledge, proficiency levels, and reflection. This concurrence led to the success of instructional practices and student outcomes over time within most American schools.

This research had the potential to confirm the purposes and benefits of professional development in mathematics to address the main idea for teachers in relation

to standards and skills. Structures related to standards and skills are a tool for teachers to be provided with strategies and professional development training to implement new and improved content and strategies (Jayanthi et al., 2017). The research established the rewards of equipping mathematics teachers with the knowledge of how to elicit student-based thinking and reasoning, but still struggled to identify the best delivery of professional development. The intended research helped to identify the impactful development of student-based reasoning and its acquisition through virtual or in-person as well as synchronous or asynchronous professional development sessions.

Other experts have agreed with the engineered approach to professional development practices and designs (Cosby et al., 2017; Kul, 2018; McGee et al., 2013; Schwarts, 2020). This research revealed the relationships between mathematics professional development, student outcomes, and informed practices of teachers through experiences. Multiple researchers have identified the significance of obtaining knowledge to infuse mathematics into instruction and implementation strategies within the American classroom setting (Cosby et al., 2017; Ring et al., 2017). Training quality and outcomes supported the design and goals of professional development, but researchers have recommended that it be inclusive of shared practices that address and improve concepts that evolve within the instructional setting (Karsenty, 2021).

The importance of MPD was evident, but the methods and structures to obtain the best outcomes were still debated. Many researchers supported alternative coaching and in-person or direct support as more beneficial to teaching and student audiences (Koichu et al., 2020). The discourse surrounding the impact of professional development and this

research partially contributed to this issue by examining the implementation and student outcomes in the mathematics curriculum (Myers et al., 2020). With the facilitation of this project, the experiential feedback from teachers' experiences allowed for further information regarding how mathematics teacher learning programs can improve to meet their needs.

Role of Technology in PD

The future of mathematics education has accelerated due to the COVID-19 pandemic resulting in the increased use of virtual tools for mathematics curriculum implementation among educators. Firdaus (2017) acknowledged students learn through the experiences of the teacher, hence the appropriateness of professional development to infuse technology. Additionally, McAleavy et al. (2018) stated that technology had a profound impact on professional development and the enhancement of teachers' learning experiences. With the incorporation of web 2.0 tools (e.g., Google Slides and Padlet) into the design of this professional development seminar, teachers experienced innovation as they learned and explored content and new approaches.

In contrast, some teachers were expected to follow the explicit curriculum guide for mathematics provided by the district's scope and sequence plan, with no inclusion of technology. Hoyles (2018) reconciled that technology education will bridge the continuity gap while improving the learners' experiences with mathematics concepts and confidence. Despite the access to technology and professional development planning, teacher implementation seemed to lack the art of technology infusion needed to address the practices and student outcomes. Benton et al. (2017) and Clark-Wilson and Hoyles

(2017) agreed that teachers and learners saw increased benefits to utilizing technology within mathematics curriculum implementation.

The benefit was also realized with applied technology and digitally enhanced learning tools in student mathematics outcomes. Benton et al. (2017) mentioned that the use of technology in mathematics instruction reflected an improvement in student engagement and analysis that directly guided the teachers' implementation methods. The infused technology practices in professional development seminars alleviated the problems by strengthening the resources that foster efficient teaching and learning opportunities (Mulenga & Marbán, 2020).

Other researchers argued that the continuity of mathematical learning in the future will vary by equitable measures, and development will be determined by the protocols for mathematics curriculum implementation and student outcomes. Chan et al. (2019) explained the evolution of the new continuum for learning as a cycle of staging, imitating, and combining interest-driven learners. Demir-Lira et al. (2020), Infocomm Media Development Authority (2020), and Cunningham and Lochmiller (2020), supported this idea, which was relative to methods that made learning meaningful instead of strategies for how the learning was acquired.

In disagreement with the push back of technology-infused learning, the International Society for Technology in Education (International Society for Technology in Education, 2019a, 2019b) outlined the expectations needed to support the roles of teachers and students working with technology. The organization concluded that the expectations should be standardized and managed around technology in the learning

environment. The standardization of the roles and expectations helped to guide the teaching and learning practices as the toolbox of web 2.0 resources became available in professional development and educational settings.

The saturation of instructional mathematics technology since the recent pandemic has lead to a focus on equitable technology usage to address the issues with curriculum implementation and student outcomes. This problem's resolution involved a deeper examination of the current implementation practices and student outcomes (Kalogiannakis & Papadakis, 2020). Therefore, the need to provide teachers with a simulated professional development seminar designed to model how technology can be utilized in the implementation of mathematics instruction is impactful.

Project Description

The mathematics professional development (see Appendix A) was a 3-day seminar geared to reinforce the training of the current Eureka Mathematics Curriculum implementation. The three sessions of the professional development addressed content aligned with (a) Best practices Tools and Resources, (b) Best Practices Strategy and Content Training, and (c) Best Practices Collaboration and Planning. Each seminar addressed the trending data challenges teachers at XYZ Elementary faced within their mathematics implementation practices. The daily seminars began with compiling and clarifying teachers' knowledge acquisitions of content and curriculum-focused ideals with an activity Know, Question, Reflect, and New (KORN). This activity was both paper-based and electronic using Padlet a web 2.0 tool, which created a visual of similarities and differences relative to the group.

The professional development began when teachers provided a list of web 2.0 tools that they used during their interviews for mathematics support (e.g., TikTok, abcya.com, and starfall.com). These web 2.0 tools, though engaging and content-related, do not directly align with the Eureka Mathematics Curriculum. This misalignment in planning resources and materials can be a contributing factor to the low-performance levels of students at this school and teacher implementation challenges. Teachers were presented with a sample alignment sheet to help determine available web 2.0 research-based resources that support the implementation needs of the existing Eureka Mathematics Curriculum. This led to the introduction of how to identify curriculum-aligned web 2.0 resources. Two web 2.0 tools (i.e., Zearn and Xtramath) were introduced and demonstrated, and I provided the teachers with a sample of a self-created alignment sheet (see Appendix A) and a mini tutorial of how these two platforms are used and can be fashioned into the Eureka Mathematics lesson implementation planning and customization sheet as a resource. Additionally, teachers were allotted time to independently create and explore a list of curriculum-aligned resources and add to the teacher toolboxes as desired. Upon reviewing those resources, the teachers created an individualized list of new or applicable tools for their implementation planning and customization practice.

The second session of the mathematics professional development focused on real-world implementation scenarios for discussion and planning review. The six scenario cards (see Appendix A) are indicative of similar mathematics classrooms (K–5 grade levels) that meet demographics and achievement scores as students of XYZ elementary

school. Teachers selected, read, reviewed and discussed the scenario cards in teams and identified new and improved methods that can be adapted into the current implementation practice. They utilized state progressional standards and experiences and offered needs assessments to better establish ideas that can lead to lesson planning and customization. This team-based evaluation was shared and modeled by grade levels for audience feedback and reflections.

The third session of the professional development included teaching and learning scenarios that included simulations of student achievement challenges based on assessment data scores from exit tickets, which were expected to design resolutions. One class simulation sheet reflected a 53% class average, well below, on an exit ticket. Teachers then identified the specific mathematics standards applied in the exit ticket. They then began to unpack those standards and mathematics content knowledge skills utilizing the lesson implementation and customization planning sheet. This sheet helped to frame the ideas and concepts needed to guide specific standards based on instructional and implementation planning next steps. Collaboratively, teachers devised a comprehensive and customized plan for the class simulations. The customized plans addressed the issues of student achievement challenges and successes based on assessment data scores from exit tickets. These customized lessons were expected to meet the design for implementational resolutions for mathematics instruction and student achievement. Teachers had a guided tool to support the implementation planning and customization template to complement the mathematics instructional curriculum design of Eureka Mathematics. Teacher groups were given a simulated class grade report on an

exit ticket/assessment and were allowed to discuss and plan to meet the needs of that class. These simulations served as discussion points for conversations across grade levels and revealed the pathway for improved instructional planning for audiences. The improvement was linked with the customization of mathematics content load, mathematics activity substitutions, and increasing mathematics scaffolding for lessons. Some class averages were well below proficiency levels and based on the skills needed for success. Teachers planned to target deficits, such as mathematics vocabulary or terms, basic and related facts, fluency inadequacies, as well as applied problem-solving misconceptions. These errors were discovered through the activities of assessment data analysis and the intentional unpacking of standards. Teachers were provided the time to predict student thinking based on work samples and assessment scores. When these activities were completed, teachers were better equipped with an outline for the roadmap to student success and intervention needs. These simulated experiences provided teachers with the time to collaborate, plan, reflect, discuss, and share the next steps and preventative measures for the implementation of mathematics instruction for their grade levels both individually and collaboratively.

Teachers reviewed the lesson implementation and customization sheet ideas and skills, which were guided by the state's progressional standards model. This led to the development of a scope for proactive measures for incorporating interventions into their mathematics instruction that were not present in Eureka Mathematics Curriculum. These actionable measures offered teachers a more informed look at the Eureka Mathematics content, state standards, and the needs for their students' mathematics learning profile.

This session of this mathematics professional development provided teachers with the much-needed time to reevaluate data, plan targets, engage in peer discussions, and develop the next steps for implementation both individually and collaboratively. Further, this session offered the concept of alignment through justifying the customization of the Eureka lessons based on the planned needs of their students. Upon completion of the professional development sessions, teachers completed an exit survey evaluating the session's content and the intended goals, abilities, and outcomes.

Implementation, Potential Resources, and Existing Supports

This district has built-in structures and resources that secured professional development opportunities at the local school level. Leaders in this local setting offered weekly 90-minute academic planning sessions and bi-monthly professional development/ half-day Wednesdays. The school setting has at least two meeting areas with chairs, tables, and technology resources necessary for facilitating the intended staff audience. The supports around the setting, presentation boards, Internet access seating, and designated meeting areas are preexisting components provided by this local school. Therefore, the resources needed regarding opportunities and location to present professional development are conducive to this local setting.

Potential Barriers and Solutions

The barriers that could develop are teacher accessibility and active participation in the professional development process. The presenter required permission from the local school leader to utilize at least three academic planning sessions or professional development half-day times. Additionally, teachers needed permission to utilize three of

these session times to participate in the professional development content and evaluation experiences. The conditions and limitations of the COVID-19 restrictions and illnesses could have been variables in the response levels and accessibility to increased pool participation. Additionally, the research period can be approved very close to the end-of-year procedures, which results in many staff transfers, leaves, and/or retirements. This timing issue could affect the responses and willingness of teachers, as it may not be deemed a priority.

To address the potential barriers regarding time, accessibility, and participation, the presenter maximized Web 2.0 alternatives (e.g., Zoom, Google Meet, Sharepoint) for delivery of the professional development. In light of the innovations around technological accessibility during the global pandemic, professional developments are more attainable based on participants' flexibility and scheduling (i.e., in-person or virtual). The presenter could record sessions and/or use video conferencing options to deliver the content and obtain full participation during the anticipated times.

Proposal for Implementation and Timetable

The professional development sessions are designed to provide refreshed content to teachers with a planning and customization tool and resources to better inform implementation practices of the Eureka Mathematics Curriculum. In each session, teachers completed an exit ticket to determine the impact on teacher potential implementation changes and share feedback via message boards/paper-based exit tickets.

The three-day training sessions will targeted the following themes:

1. Best mathematics implementation practices, tools, and resources (Day 1).

2. Mathematics implementation strategies and content training (Day 2).
3. Mathematics instructional scenario coaching, reflection, collaboration, and planning (Day 3).

Day 1 of the sessions included an introduction and synopsis of the data and research behind the current mathematics curriculum, resources, and planning tools. Based on the data collected from the participants' interviews, the resources currently being supplemented with instruction were not directly connected to the Eureka Mathematics Curriculum and lacked at-home or parental support options. Dewey's (1938) experiential learning theory revealed that teachers' experiences can help to inform and improve their craft. For the first part of the day, teachers shared the tools they have used to support the implementation of the Eureka Mathematics Curriculum via Padlet.

Responses were discussed amongst teachers in a show-and-tell design to see similarities, differences, and feedback on the view of usability, effectiveness, and alignment of the tools. The next step in this session included scenarios to promote the outline of the new planning tool and existing resources available to teachers in this district. Each resource/tool was directly aligned with the Eureka Mathematics Curriculum and provided teachers with demonstrations and report previews. The alignment of the planning tool was fashioned to specifically meet the mathematics standard-based needs for student achievement, improve time management, and address learning gaps. The discovery of the utilization and selection of the planning tool or resources teachers implement may be improved with consistently applied purpose and mathematics content alignment.

The web 2.0 tools (e.g., Zearn and Xtramath) were directly aligned with the math fluency skills, math content vocabulary, and applied problem-solving strategies of the intended mathematics implementation practices (Great Minds, 2019). Zearn and Xtramath provided step-by-step instructional videos and interactive practice content for every Eureka Mathematics lesson by grade level (see Appendix A). Teachers utilized the sample alignment sheet to help guide them in seeking out appropriate materials and resources connected to the Eureka Mathematics Curriculum. In addition to the alignment sheet, teachers briefly explored and toured these two platforms to determine ways in which Zearn can be applied as a small group or intervention resource for underperforming students. Zearn's software mirrors the Eureka Mathematics Curriculum by its scope and sequence and mathematics state standard alignment. It delivers the Eureka Mathematics curriculum in an almost identical fashion to the intended lessons. Teachers can also determine how and when to infuse Xtramath's platform as a resource within the planning and customization sheet. They identified where to appropriately customize the lessons to support the basic or related fact fluency as one of the identified areas of challenge or gaps in prerequisites with the Eureka Mathematics Curriculum's content and rigor. The Xtramath software provides teachers with the ability to set a student's mathematics grade level equivalency for progressional fluency levels. The software offers placement guidance to assess personalized error intervention and pacing adjustments and goals for the student in real-time. These platforms utilize the same strategies, lesson components, and math vocabulary as they relate to adherence to the said curriculum and its intended outcomes. They provide immediate error intervention and

feedback to the learner to support proficiency levels and accountability. Teachers, students, and families can incorporate these platforms to address the disconnect between home and school instructional support. The software provides step-by-step demonstrations, teaching, reteaching videos, independent practice drills, and strategies through gaming and/or explicit instruction at the users' level or pace. All games and practice sessions on these platforms provide engaging personalized error intervention and next-step guidance for both teachers and student users. Additionally, these web 2.0 tools provide running records and analysis data reports for individual, class, and school-wide profiles and planning or customization efforts. They can also be used in congruence with the Eureka mathematics curriculum (e.g., whole group, small groups, or individualized guidance) to support the identified mathematics student standard profiles in a more proactive and meaningful way.

Day 1 session II centered around using assessment data from three sample exit as an implementation planning strategy for mathematics instruction. At the start of the session, teachers utilized Padlet or notebook paper to record and share the teaching strategies that they believed enhance student achievement (see Appendix A). Similar to session I, teachers shared past experiences on how these strategies are utilized. They also had the option to provide mini demonstrations or examples of how the strategies were incorporated into the implementation planning sheet of their Eureka Mathematics lessons. Next, training on how to use analyze assessment data was reintroduced with the inclusion of the lesson planning and customization sheet and logs. Teachers collaboratively reviewed the concepts of formal and informal assessments while demonstrating the

ability to utilize the web 2.0 tools (e.g., paper-based assessments, Zearn and Xtramath, tools taught in session I). Teachers then had time to deliver the assessment analysis results to support the lesson planning alignment and reinforcement of grade-specific mathematics content, vocabulary, and standards. The training on how to find trends based on error interventions needed due to gaps in prerequisites connected to basic and related fact fluency, understanding and utilizing math vocabulary terms (e.g., part, whole), and common misconceptions (e.g., applying or selecting appropriate mathematics symbols and operations to solve word problems) on the sample assessments. Teachers shared demonstrations on how to examine assessments by either color coding, sorting, or listing student names into level groups to support this strategy on the lesson planning and customization sheet. Through comprehensive planning and data analysis, teachers may learn how to better help and target students. Consistently practicing these strategies may aid student achievement. Teachers can identify ways to reteach and preteach previous grade-level content knowledge (e.g., mathematics vocabulary or procedures for application) that are missing or not mastered by students. They can plan to incorporate the mathematics standard progression by identifying possible gaps in connection with data analysis. The teachers were guided to the concept of comprehensive planning actions of lessons, and analyzing assessments can help to streamline the implementation and focus on certain components of the Eureka Mathematics lesson. The experiences with the planning tool helped to ignite conversations around its effectiveness, though time-consuming, as well as the lack of time available for training for effective implementation of using assessment data as a strategy. However, highlighting the acknowledgment of the

benefits of using assessment data as strategic planning and customizing practice could improve implementation while meeting the needs for small groups and differentiation during instruction and components of the Eureka Mathematics Curriculum lessons.

The resources and tools that were provided in this session directly aligned with Eureka Mathematics Curriculum and reinforced the same instructional standards and objectives. The intentional incorporation of a comprehensive planning and customization sheet may provide intentional implementation steps for mathematics teachers. Teachers were empowered with additional tools and resources that not only reinforced but were aligned with the Eureka Mathematics Curriculum content. Some other curriculum-aligned tools were also previewed (e.g., Assistants and Affirm). These platforms/software are also directly aligned with mathematics standards, scope, and sequencing as well as anticipated instructional outcomes. These additional web 2.0 options are easily accessible for students and their direct and intentional instructional needs. This incorporation of the lesson planning and customization sheet helps to address some of the challenges participants shared in their interviews related to time management, gaps in student prerequisite skills and knowledge, as well as multileveled classrooms. The tasks are identified based on data, curriculum goals, and state standards, all specific and accessible to mathematics teachers within the district, with tutorials and testimonies of their implementation purposes and roles within the classroom setting.

All the resources and tools that were provided in this session directly aligned with Eureka Mathematics Curriculum and reinforced the same instructional standards and objectives. In closing, teachers completed an exit/evaluation ticket which determined the

impact on teacher potential implementation changes and shared feedback via message boards. Those responses were discussed amongst teachers in a show-and-tell design, using a sample alignment sheet to see similarities, differences, and feedback on the view of usability, effectiveness, and alignment of the tools and resources.

Day 2 included grade-level mathematics implementation scenarios. Scenarios were selected based on the alignment of student achievements with the Eureka Mathematics Curriculum components and grade levels represented in the session. These scenarios were created to better suit similar demographics and achievement levels of XYZ Elementary School. One scenario example that teachers explored was Scenario # 3: "You are a fifth-grade math teacher who never has time to teach all of the components of the Eureka Mathematics Curriculum lesson. You have been skipping the fluency and debriefing Eureka Mathematics Curriculum components. How does skipping these components impact student achievement? What planning improvements can you make to your math instructional practices?" (see Appendix A). Teachers read, discussed, and reflected on the scenarios to develop or reinforce planning practices that are effective for mathematics implementation. The focus on how "real world" teachers and colleagues implement the Eureka Mathematics Curriculum content to diverse leveled student audiences helped to provide insight on how to best address the time challenges experienced by the participants. The implementation scenarios generate ideas on how mathematics teachers delivered complete mathematics (e.g., Fluency Practice, Concept Development- Problem Set, Application Problem, and Student Debrief- Exit Ticket) lessons in the allocated time with fun and creative strategies to infuse all components of

the curriculum design in meaningful ways. Additionally, teachers utilized the lesson planning and customization sheet to ground the framework into mathematics standards. The incorporation of the support sheets helped to facilitate the comprehensive overview of the mathematics content standard knowledge and skills with actionable measures for improved planning, customization, and implementation of lessons.

Teachers utilized the concepts of customization by planning their instructional steps according to the curriculum guide to ensure adherence and objective goals were met within the allotted time. They identified strengths and weaknesses as individuals and as a group and provided actionable goals and next steps to improve teaching and implementation planning and identify curriculum-aligned resources. Teachers listed tools that could be incorporated to facilitate the teaching and learning processes (e.g., classroom timers, effective planning- based on the possible use of the assessment data strategy, teacher training and expertise, classroom jobs, clear expectations, and nonverbal signals and actions for both teacher and students). Discussions on the implementation of the Eureka Mathematics lessons aimed to foster teachers' concerns about issues that continuously plague the classrooms at XYZ Elementary (e.g., time management, materials, and student deficits). These challenges of student deficits and resources led the teachers to determine that customizing mathematics lessons and planning better supports regarding components and standards connected to the content should be prioritized or scaffolded. Other issues included in the scenarios were student achievement levels, issues with special education students, and the lack of measures built into Eureka's curriculum to address those areas of concern, therefore, continuing to identify variables that hinder

progress in the mathematics instructional processes as it relates to time and student success. In closing, teachers completed an exit/ evaluation ticket to determine the impact on teacher potential implementation changes and share feedback via message boards.

Day 2 comprised the training protocols for professional learning communities to support collaborative planning and implementation of the Eureka Mathematics Curriculum. This session defined professional learning communities and compared the structure to those utilized at XYZ Elementary School. Professional learning communities at this school have an existing structure and schedule; however, the protocols were inconsistent and undefined. According to Brodie (2020), the structure should promote refreshed ideas and renewed practices for teaching and learning. Fortunately, three of the five participants in this research were grade-level team leads and were more likely to be receptive to the ideas and practices needed to make planning and collaboration more purpose-driven and data-focused. Teachers participated in demonstrations on the processes needed to unpack standards relevant to the Eureka Mathematics lessons and the state standards. Teachers utilized the lesson planning and customization sheet to guide this activity. The unpacking of standards is an activity that encourages teachers to apply and practice their ability to identify verbs, nouns, and context within standards. Teachers then identified the prerequisite, skills, and content knowledge needed to meet the standard. With the newfound knowledge of unpacking standards and charting the course for implementation, teachers are armed with an informed understanding of the expectations of a standard and what it should look like in mastery by creating rubrics and sample student responses. This unpacking tool helps teachers to plan for the students that

may not meet the standard and consider collectively how to meet the needs of those learners. Lessons may be customized with the data needed to determine which components are best suited to differentiate the implementation and customized needs of the student or select groups of students. This information is further used to develop rubrics and goals for teaching and learning and was also supported by incorporating the curriculum-aligned tools and resources from Day 1. Additionally, teachers participated in a mini-evaluation and reflection on the work. This permitted discourse regarding deficits, needs, and anticipated outcomes or issues for actual implementation for both teachers and students. Finally, time was provided for teachers to plan collaboratively to evaluate which tools and resources could apply to their current teaching and implementation practices with Eureka Mathematics Curriculum.

Day 3 was focused on teacher collaboration and planning time with the customization sheet and was centered around the collaborative planning processes with a progression model or design culminating from all sessions (see Appendix A). The demonstrations of a variety of reflective planning practices with student assessment data for teacher and student planning by grade levels help to improve existing implementation and student outcomes as desired by the participants. In accordance with Ravitch and Carl (2020), gathering details on implementation experiences helps to guide and inform research while unveiling opportunities for growth and professional development.

Teachers reviewed the actions in examples of professional learning communities, student debriefing /intervention, and small group Instructional practices. The professional learning communities demonstrate ways mathematics teachers collaboratively review

student data and work samples to complete the lesson planning and customization planning sheet. Teachers took time to cross-examine, develop, and discuss rubrics, standard progression models, and possible misconceptions of student actions in application problems. Teachers were prompted to make the connection of the comprehensive nature of this tool's information to secure the next steps needed to plan to address the areas of concern as they apply within the most appropriate setting (e.g., whole group or small group intervention).

The student intervention and small group discussions help to further expose the participants to possibilities for maximizing time and value when meeting the needs of desired student outcomes in mathematics. Teachers reviewed, analyzed, and discussed the roles and structures implemented within the timeframes of the mathematics components based on shared experiences. These sessions provided opportunities for teachers to strategize how to incorporate the assessment data analysis and collaborative planning insights from the previous sessions. The differentiated classroom scenarios (see Appendix A) based on class composition and student mathematics proficiency profiles encourage teachers to reflect on aligning resources, standards, and goals to the purposes of lessons outlined in the curriculum. Further, scenarios address the need for customized lessons to target data-based deficits or errors students face with the curriculum. Through collaborative planning and assessment data analysis, teachers attempted to identify and compare planning strategies that could improve their current practices with the interactions in student groups and intervention as anticipated.

The incorporation of collaborative planning, the new planning sheet, and time management skills may help to inform how teachers and lead teachers interact with their colleagues and students in more meaningful and purposeful ways. This session provided opportunities for grade levels to cross-plan as an added or improved method to identify and target errors and prerequisites needed for each grade level. As reinforced by Dewey's (1938) experiential learning theory, having teachers engage in reflective practices helps to promote an improved understanding of effective teaching and learning outcomes. After the 3-day sessions, teachers completed an exit/evaluation ticket to determine the impact of teacher potential implementation changes and share final feedback via message boards.

The proposed implementation timeline was offered during the end-of-year months of May-June, which provided more options for flexibility with professional development scheduling (e.g., at least four professional development days and eight academic planning sessions). The end-of-year timeframe equipped stakeholders with projectable needs assessment analysis to drive new initiatives. This timeframe provided increased opportunities for teachers to reflect on the student end-of-year assessment data and teaching practices. It was the opportune time to permit teachers with the insight needed for future planning and ideas surrounding summer training for the upcoming school year. This timing also allowed the local setting leaders to establish the future mathematics academic planning focus areas for professional development while simultaneously reinforcing implementation tools, resources, and student impact.

I aimed to provide added exposure to authentic teaching planning practices, incorporating better-aligned resources and learning experiences in urban classrooms to

improve implementation and student outcomes. Participants shared the lack of time, at-home resources, relevance, and, in some cases, appropriateness of the Eureka Mathematics Curriculum for their student audience in their interviews. Therefore, these tools and resources as well as collaborative planning and assessment analysis demonstrate the alignment and implications for some success. With the incorporation of data analysis, which encourages teaching experiences and reflective planning practices, these sessions serve as an introduction to how purposeful and improved planning for the implementation of the Eureka Mathematics Curriculum may be achieved. These three, 1-day sessions, though insufficient in time and application, provided the opportunity to explore implementation planning possibilities in practical ways for this urban school and its students. The sessions also exposed participants to curriculum-aligned web tools and resources using assessment data and unpacking standards to inform teaching practices. These practices may be infused into the existing individualized and collaborative teaching and planning structures, which could support the goal of improved customized mathematics implementation and student outcomes (Kul, 2018).

Role and Responsibilities of Students and Others

The roles and responsibilities of the local setting leaders are that of granting permission for time, location, and circumstance. The school leader would have to authorize the use of any three of the academic planning or professional development session days and times. School leaders would have to assign the location within the building to deliver the presentations for the 3-day duration. In the event of scheduling issues or in-person barriers, the school leader would have to authorize the file-sharing

virtual alternative to the schoolwide communication platform. These confirmed permissions from the school leaders would ensure that professional development can be conducted on-site.

The role and responsibilities of the presenter are to be prepared and planned for each of the three 1-day sessions. The presenter needs to have a fluent comprehension of the objectives, content, and resources contained in the presentation (see Appendix A). The assigned area must be cleaned and arranged into groupings or seating to maximize collaboration within the setting. All digital links, scenario cards, microphones, Internet sources, videos, and web 2.0 tools must be active and accessible to all participants. The presenter should be equipped with basic technological troubleshooting measures that may occur. Additionally, the presenter must demonstrate professionalism and flexibility that meets the needs of the intended audience.

The roles and responsibilities of the teachers and students are to have completed their scheduled end-of-year mathematics assessments as mandated by the current scope and sequence for this local setting. Additionally, teachers need to attend or utilize the virtual tools offered to ensure consistent participation in all three sessions. Active participation with colleagues during the collaboration portions of the sessions is necessary for teachers during the 3-day session. Teachers are expected to provide honest feedback, experiences, and discoveries in relation to their implementation practices of the Eureka Mathematics Curriculum. Finally, teachers are expected to complete exit tickets and feedback message boards after each session.

Project Evaluation Plan

The project was evaluated in an outcomes-based format. The plan was outcomes-based due to the design for teacher participants to leave each session with applicable resources suited to the content and implementation practices. The end-of-session evaluations are designed to reflect the teachers' retention and execution of the applied implementation goals and outcomes presented during the MPD. Participants also complete a survey that is provided either electronically or on paper at the end of each session (see Appendix A). The surveys served to rate the proficiencies of the professional development and to identify and rate specific content areas that were impactful for participants. The electronic evaluation surveys were used to provide interactive, real-time feedback and ensure active reflective practices for the facilitator and team leaders.

The results of the evaluations provided an overview of competency and proficiency levels for the impact on mathematics teachers and the applied planning implementation activities. In the evaluations, the participants offered ideas and areas for improved quality and focus needs for future mathematics implementation professional development programs for similar schools. The rapid compilation of technology-based feedback provided a level of efficiency to the analysis needed to determine the next steps for audiences. Electronic evaluations were justified in their ability to increase productivity and simplify the process of sharing findings with stakeholders.

The benefits of the evaluations provided school and area leaders with the reassurance of the refreshed training capabilities and intended improvements in mathematics implementation at this school. They further supported the need to apply

researched-based, real-world resolutions into the implementation of mathematics content in classrooms with the renewed intent to improve student outcomes. This type of format and outcome allowed for improved mathematics curriculum implementation and professional development training practices within the district and its diverse teaching and learning competency levels.

Project Implications

The implications of this project are the improved development, planning implementation practices, lesson designs or customizations, and training of teachers, curricula developers, and the structures of mathematics programs. Though the time and application were limited, the study may provide insight into the possibility of finding implementation success. The goal of this professional development was to provide opportunities for continuous training and applied change over time. The project offered the teachers realistic, research-based additions to their existing structures that may, over time, provide some level of success. The participants indicated the need for more time and appropriateness with the content. The resources and activities shared established and demonstrated methods and examples of how comprehensive planning and lesson customization for the implementation of the Eureka Mathematics Curriculum can be tailored to corresponding grade levels and demographics. The active learning process and design indicate that change in practice will only occur over time and can only be applied once the knowledge is perceived as impactful. This project revealed opportunities to inform mathematics curricula, developers, and stakeholders with real-time needs assessments for effective instructional guidelines in programs. The project provides a

reflective and interactive stance on continuous teacher-based curriculum design needs and implementation training practices of current resources and materials that were intended to positively impact the classroom. The increase in reflective planning with mathematics curricula development and implementation practices can help to develop the best formula for instructional design, implementation success, and improved student outcomes. By examining teachers' mathematics implementation practices in this project, the academic community can develop a more customizable and collaborative climate amongst developers and teachers while improving the blueprint for favorable student outcomes.

The continued challenges revealed through this project reflected those of teacher training, time, and determining real impacts on student learning gaps. Teachers were exposed to a helpful lesson planning and customization tool, sample alignment, and student knowledge sheets as well as a few web 2.0 resources (e.g., Zearn, Xtramath, Assistants, Go Formative) to help support the improved implementation of the Eureka Mathematics Curriculum. This lesson planning sheet may help teachers to provide customization via fluency drill routines and implementation selections, which may be either paper-based as directed or technology-infused based on assessment data trends. Teachers may identify their roles as academic experts and facilitators as they, too, are aware of the need to remain in touch with best practices and student support trends. The teachers in this project could collectively realize that a teacher must be a lifelong learner with consistent quality training, an equitable curriculum, and access to aligned tools, technology, and resources that support invested stakeholders. Teachers in this project

wanted the community they serve to know that everyone has a job to do when educating children, and it will take time to make those changes a reality.

Local Community

The local community will benefit from this project due to the improved awareness of the need for the consistent evolution of mathematics teachers' skills and curriculum implementation planning and lesson customization practices. This evolution will be reflected in student achievement as well as an improved quality of mathematics curriculum implementation and proficient college and career students within this urban area. Communities with better-trained mathematics teachers and educated citizens tend to have access to better resources and opportunities for employment and expansion. The local school community will have the ability to produce well-educated learners that possess the critical thinking and problem-solving skills needed to enhance any environment. Teachers can utilize the training delivered from the project to provide purpose and alignment in planning, implementation, resources, and materials to facilitate this need for improved critical thinking. This project demonstrated improved incorporation of student debriefing and small group instructional strategies and offered insight into how teachers can better employ critical thinking and analysis within their existing instructional design (e.g., student debrief-problem sets/ exit tickets). By effectively utilizing the data and comprehensive standard-based planning sessions as explored in this project, teachers can provide meaningful opportunities for improved implementation as they proactively plan to clarify and intervene with students in an individualized and intentional approach. As stated in the professional development

sessions, small group time creates a more personalized space for students to express and explain their thinking and mathematical processes to their teachers and peers. If teachers plan proactively to meet the learners' needs more intentionally and comprehensively, customizing their learning could help transform the instructional design for all stakeholders. Today's learners can be positively impacted by well-trained teachers and will, in turn, become the professionals that create economic growth and social equity amongst future generations of civilians.

Larger Context

The results of this study will positively affect the perspective and best practices of stakeholders in relation to curricula design and planning for its implementation and the compatibility for diverse audiences. The examination of teacher planning and implementation of mathematics curricula should alert districts and developers to the idea of flexible selection and customizable content or provide opportunities for schools to implement the tools and types of curricula and practices relative to the school's climate and demographic needs. This level of customization supports the goal to address the challenges with time, implementation, and student gaps in skills and resources across the United States. The one-size-fits-all approach to teaching and learning must be dispelled for any instructional environment. The consideration of including continuous teacher planning sessions and the active use of the lesson planning and customization sheets, resource alignment, and standard proficiency sheets helped to maintain a routine and comprehensive approach to customizing the lessons. The consistent practice of curriculum or lesson customization development and implementation planning in urban

districts such XYZ Elementary School may offer a chance to redeem the academic achievement and success of its students.

Conclusion

If all stakeholders actively collaborate with teachers in mathematics classrooms, quality curricula and instructional planning as well as implementation practices will continuously evolve. In Section 4, I provide reflections and conclusions for this project.

Section 4: Reflections and Conclusions

This professional development project was designed to promote professional practice and discourse involving planning and implementation of mathematics instruction within the elementary classroom. Consequently, this project provided a safe space for educators to discover, discuss, reflect upon, and evaluate experiences in order to inform their practice, restock their toolboxes, and refine their instructional planning skills. With professional development and training involving new or improved mathematics planning practices, teachers will be able to share and express their successes and challenges over time.

Project Strengths and Limitations

Teachers have had the opportunity to identify and plan in order to comprehensively execute improved implementation practices for mathematics instruction. Incorporation of a comprehensive planning tool and EMC-aligned web 2.0 tools provided the opportunity and time to design better ways to address areas of concern for participants involving time, resources, and at-home support. Teachers' methods to scaffold implementation and support student achievement were addressed via professional development lesson planning sheets and data analysis activities. Teachers were also provided with resources involving extending at-home support in order to address one of the challenges teachers expressed, which was lack of parental support and homework reinforcement. I addressed implementation planning practices that mathematics teachers in the same school and district had been offering to their student audiences.

Lack of evolution within governmental structures remained a systemic struggle relative to social and economic inequities in terms of educational policies and procedures. Selection of a diverse curriculum improved ongoing teacher training opportunities as well as access to resources in some school districts. Teachers in this setting revealed the need for a more comprehensive curriculum to meet the needs and demographics of their students.

Recommendations for Alternative Approaches

The problem that was addressed was despite teachers' implementation of the Eureka Mathematics Curriculum, students at XYZ Elementary School have underperformed on mathematics standardized tests for the past 5 years. To better address this problem, I propose increasing the numbers of participants, observations, interviews, and surveys that are incorporated into the process. Themes such as lack of partnership of stakeholders, misaligned curriculum, and teacher proficiency could have been quantified.

Conducting surveys or interviews with parents could have improved this research and would have led to more comprehensive perspectives. Parental support was needed to ensure the roles and responsibilities of teachers and learners alike are being maintained. If or when this parental support was present, it created an environment of accountability for all participants. Support of parents leads to alignment and honest discussions involving resources and interventions needed for school and home communities.

Districts that do not utilize programs or resources that aim to address critical gaps in mathematics achievement are minimizing student success. Teachers and students must have tools and resources to efficiently identify, strategize, and address mathematical gaps

of students. Teacher training remains at the forefront of impactful teaching and learning opportunities.

Including surveys or observations involving professional development and implementation practices could have a significant impact on research. Underperforming scores on mathematics standardized tests could have been addressed by including opportunities for surveys regarding parental support, teacher and student observations involving mathematics implementation, student intervention experiences, and interviews with stakeholders.

Scholarship

As a Walden doctoral student, I acquired new knowledge about scholarly research. This journey has led me to develop a variety of skills involving professional development of teaching professionals. I have learned to seek out quality literature beyond the scope of a narrow theme to enhance discourse and validity. Finding literature that both defends and challenges concepts and themes helped me to ascertain many innovative ideas. Skills involved with systematic research and ethics have become tools I respect and use in all decision-making processes. This research provided varied perspectives that enabled the formulation of rationales and a vision for change.

This research has enhanced the concepts of effective communication and collaboration in an ever-changing society. These collaborative experiences are not new, but have been essential in this new era of technological advancement and the global pandemic, especially within the field of education. Walden has served as an innovative institution with a blueprint, that transcended scholarship into the many benefits of web

2.0 tools. The academic experiences with virtual simulated schools, on-demand access to classes, and discussion forums have all served as memorable and real-world learning experiences.

Walden's scholarship has peaked my desire to share my passion for teaching and learning with others and has rejuvenated the need to contribute to the improvement of our world by becoming an agent of change. The interactions with teaching communities, stakeholders, and academic data have all led me to recognize the necessity to contribute to this much-needed change. I have now established a set of tools through ethical research and a sense of community through interactions with others, which led to an improved state of being. It is now time to catalyze this passion with others within the field of education so that they, too, will be encouraged to participate in their changes toward professional development.

Project Development

During this project, I had the opportunity to transform teaching and learning approaches. I have reviewed policies, equitable practices, stakeholders, and curriculum developers' roles within the field of education. This transformation has led to ideas that can be further evaluated to determine their exact function and effectiveness for the future of teaching and learning practices. I drafted an approach to resemble that of Dewey's (1938) experiential learning theory and the need to apply reflection as a catalyst for positive change. This theory and its intended outcome to produce purpose from experiences have been a compass throughout each phase of this work.

In the quest to discover teachers' implementation of the Eureka Mathematics Curriculum and student outcomes on assessments, I quickly realized the value of equitable curriculum development and teacher training. Systemic issues have become more blatant over the past few years. The inherited design of social injustices and economic disparities has made a resounding presence in global media. These structures have brought a new awareness of the changes needed for more equitable opportunities with our social and systemic agendas. Now is the time for these changes to meet the core of human evolution, which is embedded in our acquired knowledge.

Leadership and Change

Walden's scholarship has motivated the transformation into an agent of change. The facilitation of this research has revealed the need for improved mathematic curricula and policy reforms. Reforms must be made regarding policies and procedures relative to curriculum development and its personalization for our diverse populations. For change to occur, continued research surrounding mathematics outcomes must be enhanced. The recognition of the problem in mathematics student achievement within the United States is documented and must be addressed. Leaders and stakeholders must be educated on the needs assessment from both teachers and students along with possible resolutions. Every year that passes, teachers and students are working with subpar content or materials that do not or cannot meet the needs of the learners inside the classroom. This contributes to the widening of the gaps and equity for our future leaders.

Leaders within the field of education must collaborate across districts and states to help acquire templates necessary for mathematics curriculum to possess customization

protocols in order to improve teacher implementation practices and student outcomes. Advocates are needed to encourage stakeholders who are removed from the classroom to make such impactful decisions. Leaders and advocates must join forces and witness real classroom experiences that are true to the dynamics and challenges that average teachers are presented with daily.

Reflection on the Importance of the Work

The work surrounding the implementation of mathematics curriculum and student outcomes is essential to the development of the world. Throughout this doctoral journey, I realized how vital it is to be curious about the information and experiences we encounter in life's journey. I determined that curiosity could ignite the flames of awareness and evolution that are crucial to the positive development of this world. This level of doctoral study has provided a scope of improved, unbiased perspectives that help to challenge or justify the need for change. It allowed a viewpoint beyond the walls of a local classroom to explore the concepts and themes that were being experienced globally. This scholarship at Walden has improved my ability to gather and analyze evidence and quality data points to devise resolutions and improve outcomes. I have become more grounded in the world of research and its ability to develop patience, persistence, and a thirst for social change.

The process of earning this doctoral degree has solidified the importance of the role of effective communication in my professional practice. In every phase of this academic program, reading, interpreting findings, and relevant elements led to a desire for transferability. I knew that the acquired knowledge could only be beneficial if it is

communicated in ways that invoke relevance and meaning for audiences. The selection of communication tools needed to be diverse and easily accessible with a focus on how it can directly impact or affect the audience. This led to the realization that not all audiences are created equal, and that resistance is inevitable. With that realization, I had to generate purposeful methods to communicate with the "resistance" and evolve in the approach or design of the focus. Effective communication is at the core of human existence and can be leveraged in ways that help us to continuously evolve and elevate the world.

Implications, Applications, and Directions for Future Research

Future research in this area should be centered around curriculum design models. Curriculum developers must realize that the content should be as personalized as the individuals' teaching and learning it. Numerous research-based curricula address the learning styles and content requirements of the classroom, but they lack customization. The level of customization could be developed due to the research findings of Demir-Lira et al. (2020), which indicates the need for recognizing the new design of the learning continuum stages. The stages are relative to staging (demonstrating ideas and with continuous discourse and feedback resulting in habits), imitating (incorporating existing knowledge from the outside world and experiences), and combining (creating/synthesizing outcome-based artifacts that reflect applied learning) as an interest-driven learner. Exploring the theory of interest-driven learners in mathematics lends credence to the ideals of the new methods of creating high-quality interest-driven learners.

Building an interest-driven learner implies the acquired knowledge of the specific needs of a specific learner. The concept of customization in curriculum supports the new ideal of the interest-driven learner. Customizing curriculum programs will automatically supersede ethnicities and learning styles and aim to address the global cultures in which we now live. Customization is necessary and relevant for individuals within an academic setting or district and creates a level of awareness and equity for all learners and teaching professionals. In future research, equitable measures must be addressed as developers and stakeholders begin to design programs for districts that serve diverse communities (Chan et al., 2019).

Theories relative to mathematics identity should be explored in future research. Attempts to identify the dispositions of varied cultures or ethnicities may be beneficial in addressing the needs for improved development of mathematics curriculum and customization (Young et al., 2020). Curriculum developers offering customizable mathematics curricula provide an increased opportunity for equity across the world. Stakeholders can begin the search to secure a mathematics curriculum developer that has a variety of skills and aligned resources needed to address the specified student audiences. The awareness of and focus on mathematics identities can help to address the issues regarding equity and accessibility in mathematics classrooms around the world.

In future research, there should be some additional considerations for challenges based on time or timing. Teachers identified timing as an area of challenge or disadvantage. Teachers felt that time for mathematics instruction in addition to other demands within the mathematics block created concerns about implementation and

student achievement. Taking a deeper look into the issues surrounding time or the use of time could be beneficial for mathematics instruction, student achievement, and teacher training (Patall et al., 2010). This research may have benefitted from increased time for deeper leveled interviews with participants and could have been more impactful if the time and opportunity for instructional implementation observations were available.

This site and others are facing enhanced school development into 21st-century buildings. These types of transitions could have contributed in other ways to implementation and outcomes. The new features and need for differentiated professional development training for buildings like this may lead to more insightful teacher mathematics implementation practices and student achievement data for mathematics outcomes (Infocomm Media Development Authority, 2020). Teachers at this site and around the world could benefit from continuous professional development that enhances the incorporation of technology into mathematics implementation (International Society for Technology in Education, 2019a, 2019b). Professional development for teachers should resemble the technology-enhanced tools and resources that will be available to students (McAleavy et al., 2018). Despite the conditions and limitations of the COVID-19 restrictions and illnesses thrusting technology into mathematics instruction, teacher proficiency in technology usage remains an important variable. Additional research is needed to support the proficiency levels of teachers with the infusion and alignment of technology in mathematics classrooms.

Conclusion

Mathematics skills are essential to the world of teaching and learning. It offers the foundation that contributes to the many ways in which we live and evolve. Mathematics implementation varies throughout the world, countries, states, and classrooms, but it remains the common denominator in the reasoning and proficiency levels of our community members. The content area of mathematics supports our societal development in science, medicine, technology, and commerce. The role of mathematics in our world helps to build a problem-solving mindset that improves our understanding of the structures and systems in which we live.

In a world where one can utilize technology to customize everything from shoes to portable devices, this same concept must be transferred into the revisions of curricula selections, educational policies, and systems. Stakeholders must evaluate the resources, tools, and methods currently mandated for decision-making and the intended impact on its recipients. This evaluation must include the mathematics curriculum writers and the ability to gather a more comprehensive examination of profiles of districts and communities and their tangible needs and outcomes. Mathematics curriculum writers must be capable of providing flexible options within curriculum development that improves, rather than stifles, proficiency levels.

The need for mathematics curricula to be customizable for specific demographics, learning styles, and levels is apparent in the low-performing mathematics scores in this country. Curricula must be supported with the active flexibility for teacher voice and intervention practices built in to provide the predictable error intervention

needs for teachers, no matter the skill or experience levels. Mathematic curriculum writers should anticipate some of the issues that may arise and offer remedies to intervene from the novice to the veteran teacher. These simple accessible tools within any mathematics curriculum may positively impact the implementation experiences for all. Ultimately, the goal should be to improve our world through equitable academic and social changes with future leaders that enroll in classrooms.

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Appendix A: The Project

Introduction

The goals for the participating audience in this professional development are (a) to provide experiences with planning tools and resources to support the implementation of the Eureka Mathematics Curriculum, (b) to promote continuous collaboration of mathematics teachers, (c) to enhance mathematics teachers' planning and implementation of Eureka Mathematics Curriculum, and (d) to increase mathematics teachers' experiences with real-world activities to reduce the number of underperforming students in mathematics. Professional development opportunities that provide real-world scenarios and simulations result in more equitable outcomes for teachers and students (Greenleaf et al. 2018). Mathematics teachers at XYZ elementary school were exposed to scenario trainings, how-to resources, and simulated assessment data analysis practices of the Eureka Mathematics Curriculum implementation to help analyze and develop individualized reflective plans for future instruction. This professional development seminar will help to equip the mathematics teachers in this urban school with a new or renewed set of lesson planning activities and practices and curriculum-aligned resources to implement in the classroom setting. The mathematics professional development is a 3-day session geared to reinforce the training and implementation planning of the current Eureka Mathematics Curriculum.

The three sessions of the professional development addressed content aligned with (a) Best Practices Tools and Curriculum aligned resources, (b) Best Practices with Data Analysis as a Strategy, and (c) Best Practices Collaboration and Planning. Each

seminar is designed to revisit the trending data challenges teachers at XYZ elementary faced within their mathematics implementation. During the 3-day professional development series, teachers had the opportunity to obtain planning support and resources to improve teacher skills. The mathematics teachers were engaged in collaborative experiences that offer three main objectives. The objectives for the professional development are (a) to build a toolbox of resources, (b) to identify best practices and curriculum-aligned materials, and (c) to utilize a comprehensive lesson implementation and customization sheet. These professional development objectives supported and offered a comprehensive teaching planning sheet aimed to improve the implementation of the current mathematics curriculum, Eureka Mathematics Curriculum. Teachers participated in a series of engaging activities that helped to better inform and direct the implementation planning and customization skills for math instruction over time.

Purpose and Goals of the Project

The professional development sessions are designed to provide refreshed content to teachers with lesson planning tools and resources to better inform implementation practices of the Eureka mathematics curriculum. This project provides an outline of the training goals and activities presented for the 3 days. The professional development included hands-on activities for improved training experiences for mathematics teachers at this site. In each session, teachers completed an exit ticket to determine the impact on teacher potential implementation changes and share feedback via message boards for professional development next steps.

Target Audience and Learning Outcomes

The learning outcomes for this mathematics professional development are to supply the teachers at XYZ elementary school with ideas and training on the utilization of the lesson planning and customization sheet, samples to help to identify curriculum-aligned web 2.0 resources, and shared implementation practices applicable to the classroom setting. Renewed training and resources are tools necessary for increasing teacher proficiency levels in content and instructional practices (Evans, 2019). Differentiated methods for teacher training, such as comprehensive planning practices, simulated classroom data analysis outcomes, and scenario reflection, are ideal for professional development. These methods offer high quality content infusion, elevate the process, and increase the likelihood of active application of taught strategies in the classroom. When teachers are better equipped with realistic and relative practices, they may positively impact their learners while simultaneously improving their implementation craft.

Project Design and Timeline

The implementation timeline was offered during the end-of-year months of May-June, which provided more options for flexibility with professional development scheduling (at least 4 days for professional development and eight half-day academic planning sessions to choose from). The end-of-year timeframe equipped stakeholders with projectable needs assessment analysis to drive new initiatives. This timeframe also provided increased opportunities for teachers to reflect on the student end-of-year assessment data and teaching practices. It was the opportune time to permit teachers with

the insight needed for future planning and ideas surrounding summer training for the upcoming school year. This timing helped the local setting leaders to establish the future mathematics academic planning focus areas for professional development while simultaneously reinforcing implementation tools, resources, and student impact.

Project Materials and Supplies

- Laptop
- PowerPoint Presentation
- Smart Board
- Handouts & Notebook Paper
- Internet/ Hopt Spot Access
- Scenario Cards Sheet
- Videos: https://www.youtube.com/watch?v=-bEcE9xtiD0&list=PL5hZODX6QeTbNua8XpQh0VRi-DCl2U_jb

Day 1: Professional Development Session- Notes Tools, Resources & Strategies

Mathematics Coach's Notes:

- Mathematics Coach provided an introduction and synopsis of the data and research behind the current mathematics curriculum, resources, and tools. Based on the data collected from the participants, the resources currently being supplemented with instruction were not directly connected to the Eureka Mathematics Curriculum and lacked at-home or parental support.

- For the first part of the day, teachers shared the tools they used to support the implementation of the Eureka Mathematics Curriculum via Padlet.
- Responses were discussed amongst teachers in a show-and-tell design to see similarities, differences, and feedback on the view of usability, effectiveness, and alignment of the tools.
- Mathematics Coach used scenario cards, demos of the tools, and resources currently available to teachers in this district. Each resource/ tool was directly aligned with the Eureka Mathematics curriculum and provided teachers with facilitator-guided demos and report previews.
- Mathematics Coach expressed the alignment of the tools that are fashioned to specifically meet the needs for student achievement and time management and to address learning gaps and their connection to the planning sheet and logs.
- Mathematics Coach shared that the web 2.0 tools such as Padlet, Zearn, and Xtramath provided in this session were directly linked to the basic and related fact fluency skills, applied mathematics problem-solving content, and strategies surrounding intentional teaching or reteaching of mathematics vocabulary.
- Support was provided in multiple ways, such as facilitator demonstrations, scenario card teaching, and sharing independent practice drills through gaming and/ or explicit instruction at the users' level or pace.

- Teachers shared past experiences on how these tools and resources were utilized and provided mini demonstrations or examples of how they were incorporated into the implementation of Eureka Mathematics lessons.
- Mathematics Coach used three sample exit tickets to train teachers on how to use assessment data to plan and customize lessons with the planning sheet. Teachers were taught the concepts of formal and informal assessments while demonstrating the ability to utilize tools (paper-based assessments, Zearn, and Xtramath software as previously taught in session I).
- Mathematics Coaches and teachers located trends based on error interventions needed due to gaps in prerequisites, proficiency of fluency processes, math vocabulary, and common misconceptions in assessments. Teachers identified the standards based on the exit ticket. Then they used these standards to determine what errors the students made and possible reasons why. They utilized the lesson planning and customization sheet to find the progressional standards and determine students' mathematics profiles or proficiency levels. This information was then used to chart the new content standards needed and the next steps outlined to support customization and implementation of content to meet/ address student achievement.
- Teachers participated in the facilitator's demonstrations on how to "look" at assessments by either color coding or forming, sorting, and listing student names into level groups to support this strategy using the student profile sheet.

- Mathematics coach expressed that completing the comprehensive lesson planning and customization sheet helps to provide the framework for intentional g planning. The sheet outlined the types of thinking or questioning that needs to happen during lesson planning and customization. Teachers actively used the sheet to experience how they could strategically help and target students' needs. Teachers identified module goals, standards and progressional skills, and knowledge. They identified the intended quality of responses, materials, strategies, and resources needed for error intervention or acceleration. If this utilization of the planning sheet becomes a consistent practice or routine in planning, student success may be met. The teachers expressed whether they realized how these reflections of assessments can help to streamline the implementation and focus on certain components of the Eureka Mathematics lesson to identify further needs.
- Mathematics Coach stated the realization of how using assessments may be time-consuming initially, and the lack of time available for training for effective implementation of using assessment data as a strategy continues to deter growth.
- Mathematics Coach identified the benefits of using assessment data as a strategic practice to improve implementation while meeting the needs for small groups and differentiation during instruction and components of the Eureka Mathematics Curriculum lessons. By actively identifying student needs through the exit tickets, teachers can match the skills and standards in the lessons needed to teach, shift to small groups, prioritize, or infuse into the varied components of the Eureka

Mathematics lessons. This awareness leads to planning and customization for the student audiences with justification.

- Mathematics Coach explained that the resources and tools provided in this session were directly aligned with Eureka Mathematics Curriculum and reinforced the same instructional standards and objectives. Teachers interactively reviewed the alignment sheet to help identify the indicators of the same standards or content from listed or previously utilized web 2.0 tools and resources to help determine alignment.
- Mathematics Coach mentioned the intentional incorporation of additional tools that reinforced content from the classroom and the curriculum is easily accessible.
- Mathematics Coach reinforced that this incorporation of planning sheets as tools may help to address some of the challenges participants shared related to time management, gaps in student prerequisite skills and knowledge, as well as multileveled classrooms.
- Teachers completed an exit/ evaluation ticket which determined the impact on teacher potential implementation changes and shared feedback via message boards.

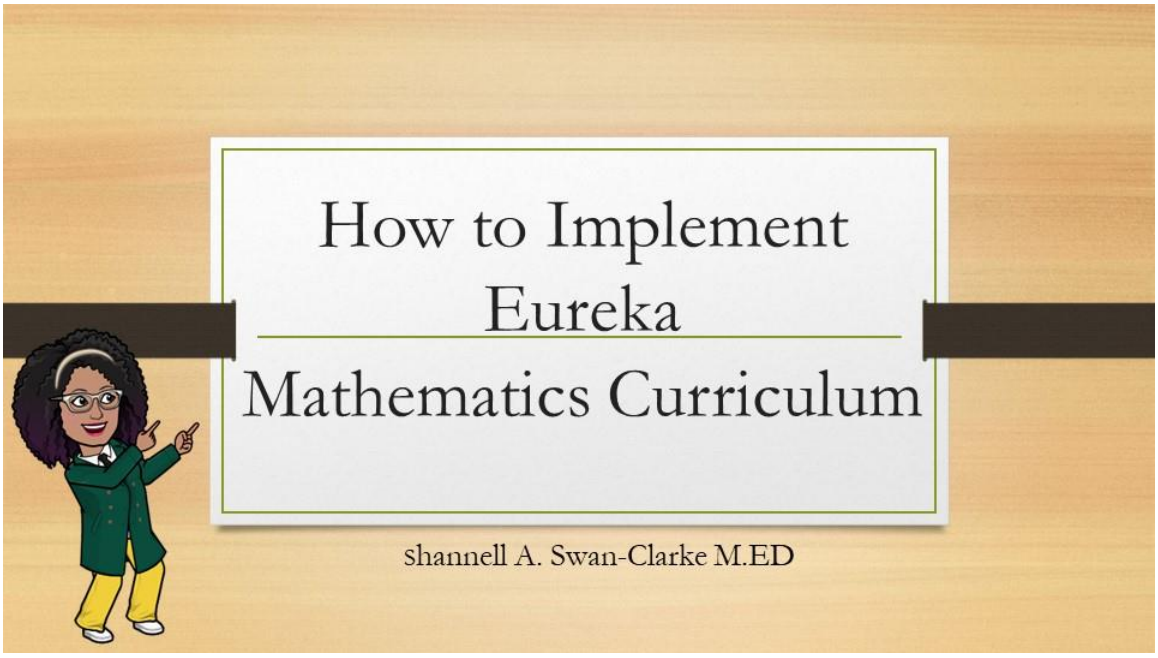
Project Agenda

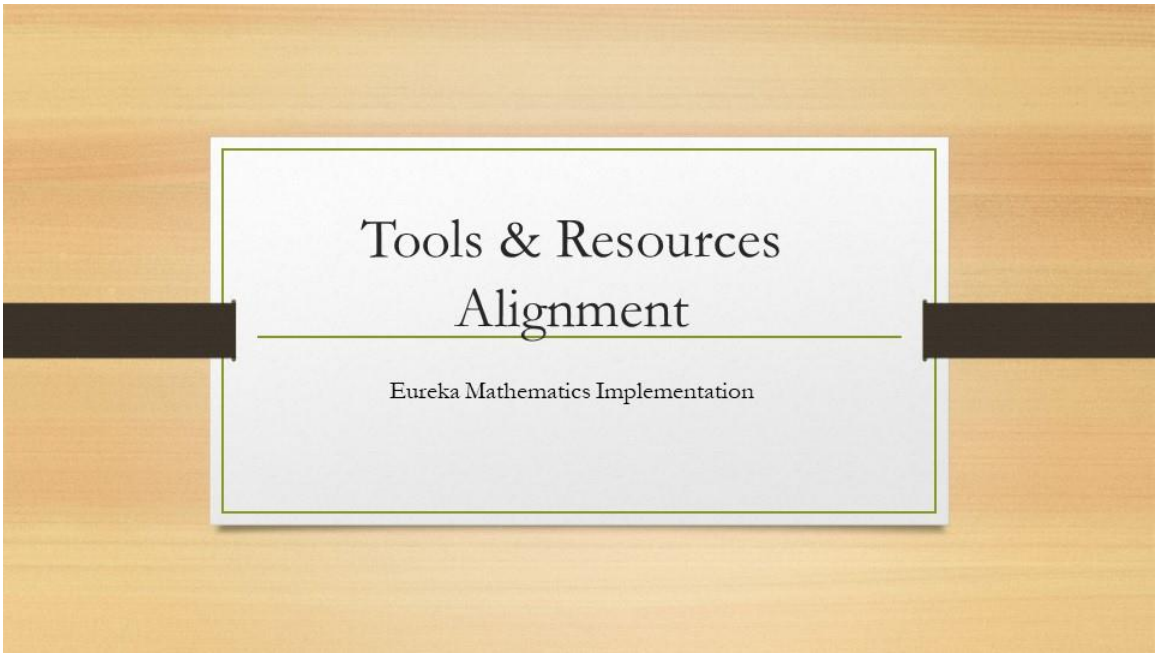
Day 1: Best Practices: Tools, Resources & Strategies

8:00 AM - 9:00 AM	Session I: Best Practices EMC Resources and Tools (Padlet/Setup/ usage/ Notebook paper)
9:00 AM - 10:00 AM	Training Curriculum Aligned Tools & Resources (Tutorials, Practice/ Demo, Account Setup)
	10:00- 10:15 BREAK
10:15 AM - 11:30 AM	Session II: Best Practices EMC Strategies &Techniques
11:30 AM - 12:30 PM	Lunch
12:30 PM- 1:30 PM	Training: Using Assessments as a Strategy (Pre-tests, Quizzes Post Tests)
1:30 PM - 2:30 PM	Practice Strategy- Using Assessments to Teach (Develop teaching targets based on assessment samples)
2:30 PM- 3:00 PM	Closing /Exit Ticket (Electronic/ Paper)

Project PowerPoint Slides

Day One





Day 1
Session Outcome

- Explore curriculum aligned resources and tools for implementation of Eureka Mathematics Curriculum.

What does Curriculum alignment mean?

Materials are aligned when State Standards and Academic Content are similar and embedded in the materials.

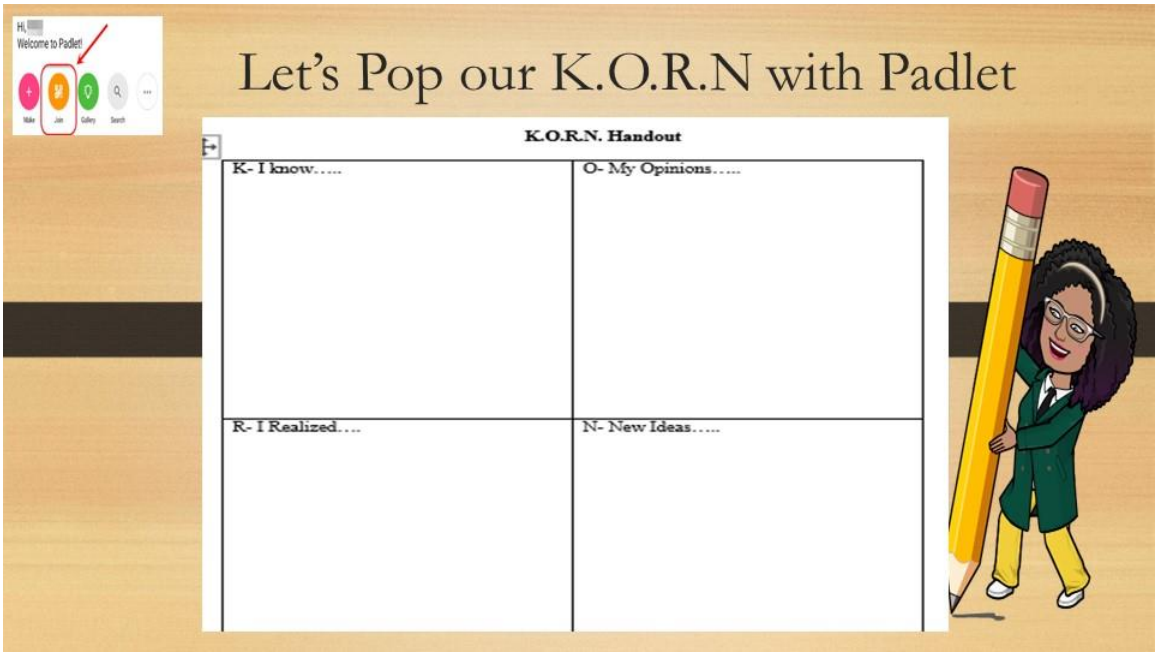
Sample Alignment Sheet

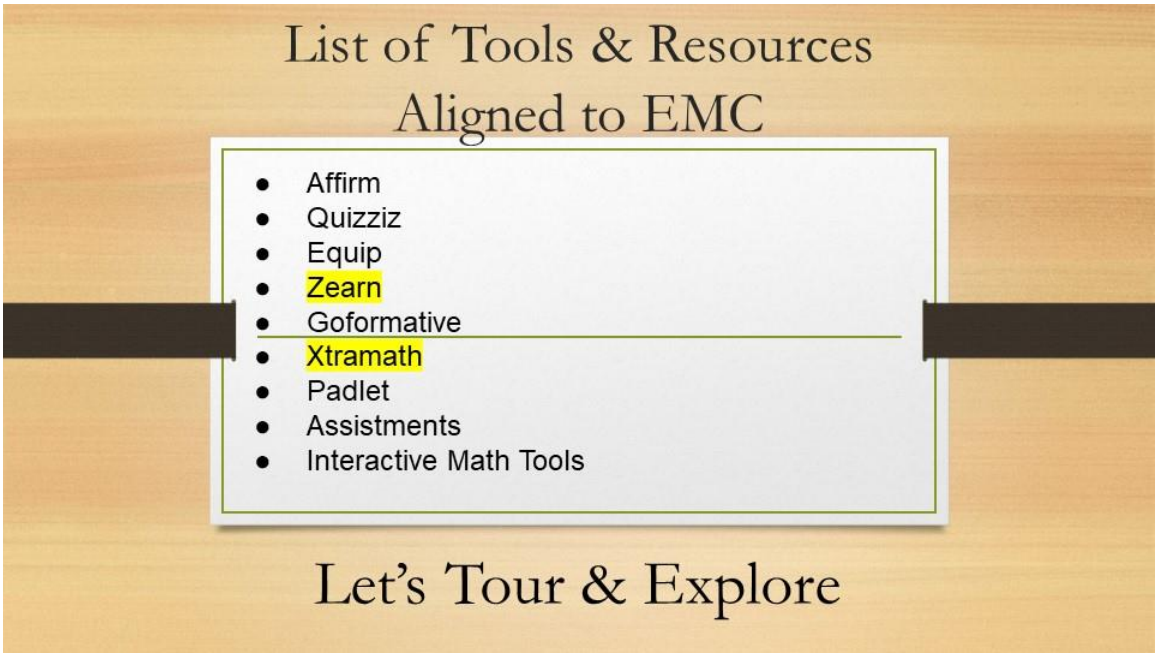
Eureka Mathematics Curriculum	Direct Alignment	Zearn
Module 1 Sums and Differences to 10	→	**Mission 1** Add and Subtract small numbers
Module 2 Introduction to Place Value	→	**Mission 2** Place Value
Module 3 Ordering and comparing numbers lenth as numbers	→	**Mission 3** Measure Length
Module 4 Addition and subtraction to 40	→	**Mission 4** Adding and subtracting big numbers

EMC Implementation Components

- Fluency
- Concept Development
- Application Problems
- Student Debrief

What tools or resources do you use to facilitate these components during implementation?


Let's Pop our K.O.R.N with Padlet
K.O.R.N. Handout
K- I know…..
O- My Opinions…..
R- I Realized….
N- New Ideas…..

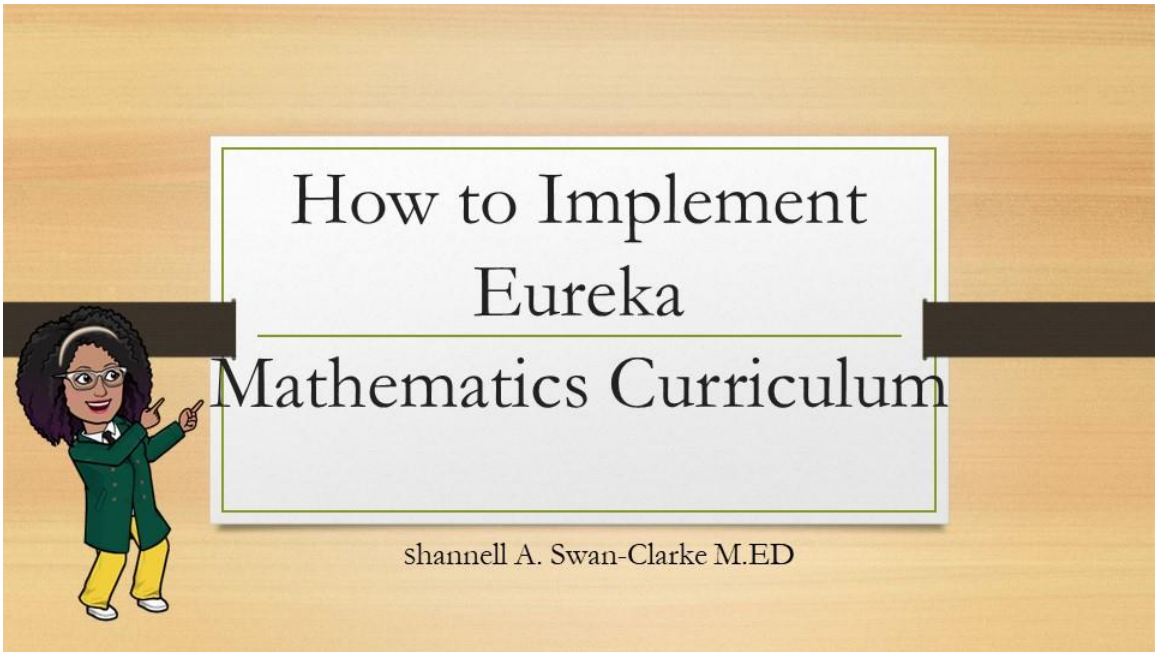

List of Tools & Resources
Aligned to EMC
Affirm
Quizziz
Equip
Zearn
Goformative
Xtramath
Padlet
Assistments
Interactive Math Tools
Let's Tour & Explore

Aligned Web 2.0 Resources

*Resources can be utilized Whole Group, Individually, or Small Groups

Website	EMC Fluency Implementation Support	EMC Concept Development Implementation Support	EMC Application Implementation Support	EMC Student Debrief Implementation Support	EMC Home Support
Xtramath.org	★	★			★
Zearn.com	★	★	★	★	★

EMC Web 2.0 Resources Intro, Alignment & Demo


How to Implement
Eureka
Mathematics Curriculum
shannell A. Swan-Clarke M.ED


Using Assessment Data as a Strategy
Planning
Actions
Next Steps

Using Assessment Data as a Strategy

EMC Assessment Data at a Glance

- Trends
- Strengths
- Weaknesses
- Trouble spots
- Embedded Standards
- Prerequisites
- Needs Assessment

EMC Strategies & Techniques

- Analyzing Assessment Data
- Small Group Instruction
- One on One Instruction

Sample Data Analysis Profile Sheet

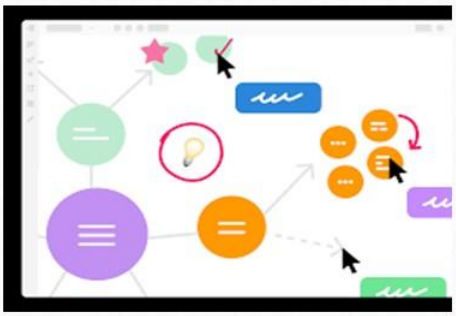
- Class Mastery
- Student Profile
- Standards Based
- Differentiating
- Prerequisites

Sample Mathematics Content Knowlegde Profile Checklist (see page:96)

Student	Standard #	Standard #	Standard #	Standard #	Standard #	Standard #	Standard #	Standard #
Totals								

EMC Implementation & Aligned Tools

- Affirm
- Equip
- Zearn
- Goformative
- Xtramath
- Padlet
- Assistments
- Interactive Math Tools



Which tool would you utilize ? Explain

Exit Ticket

- Please complete the exit ticket before you leave.

Thank you!

Project Handouts Day 1

K.O.R.N. Handout

K- I know…..	O- My Opinions…..
R- I Realized….	N- New Ideas…..

Sample of Grade 1 Zearn Alignment to Eureka Mathematics Curriculum

Zearn is utilized for whole group, individualized reteaching or in small groups (see p. 118).

Eureka Mathematics Curriculum	**Direct Alignment** 	**Zearn**
Module 1 Sums and Differences to 10		**Mission 1** Add and Subtract small numbers
Module 2 Introduction to Place Value		**Mission 2** Place Value
Module 3 Ordering and comparing numbers lenth as numbers		**Mission 3** Measure Length
Module 4 Addition and subtraction to 40		**Mission 4** Adding and subtracting big numbers

Daily Session Agenda

Day 2: Best Practices & Strategies

8:00 AM - 9:00 AM	Best Practices Strategies (Padlet/ Notebook paper)
9:00 AM- 10:00 AM	Mathematics Instruction (Scenario)
10:00- 10:15	BREAK
10:15 AM - 11:15 AM	Implementation Practice (Scenario)
11:15 AM - 12:15 PM	Lunch
12:15- 1:15 PM	PLC: Implementation Plan (Unpacking Standards/ Setting Goals)
1:15 PM- 1: 30 PM	PLC: Implementation Plan (Explore Content/Connect Resources)
1:30 PM- 2:30 PM	PLC: Implementation Plan (Planning Application/Reflection)
2:30 PM - 3:00 PM	Closing Exit Survey (Electronic/Paper)

Day 2 Professional Development Session: Best Practices & Strategies

Mathematics Coach Notes

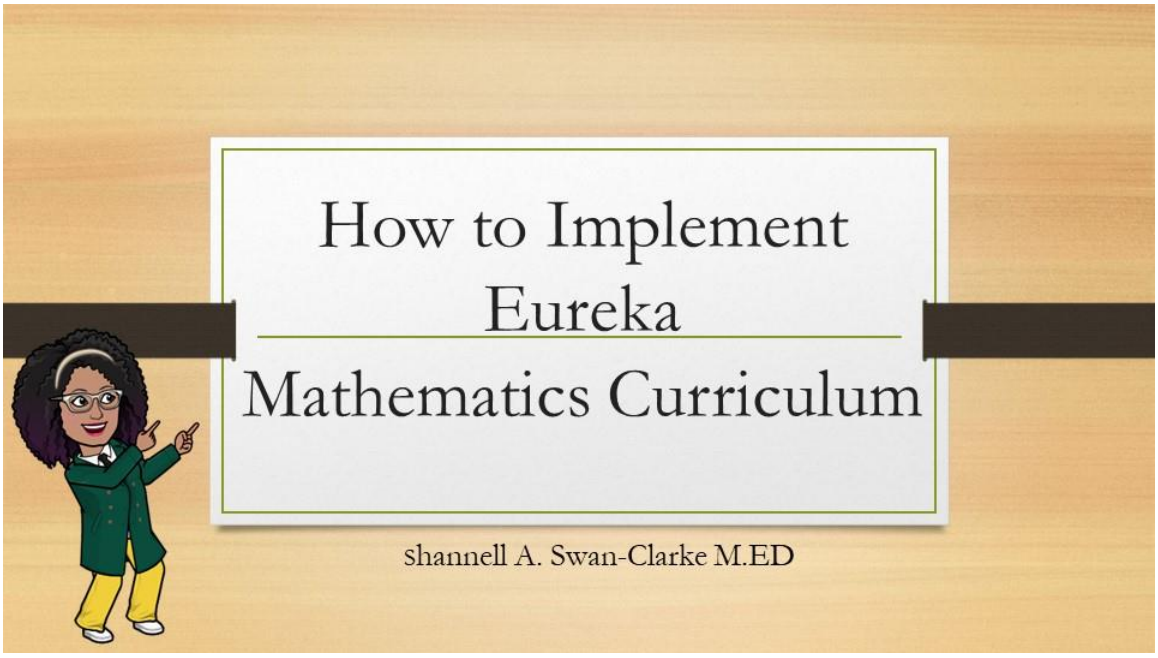
- Mathematics Coach presented implementation scenarios based on the alignment of the Great Minds Eureka Mathematics Curriculum and grade levels represented in the session.
- Teachers read, discussed, and reflected on the scenario cards to develop or reinforce practices that are effective for mathematics implementation. The focus on how "real-world" teachers and colleagues implement the Eureka Mathematics Curriculum content to diverse student audiences helped to provide insight into how to best utilize the time challenges experienced by the participants.
- Mathematics Coach discussed how the implementation scenarios reflect how mathematics teachers delivered complete mathematics (Fluency Practice, Concept Development- Problem Set, Application Problem, and Student Debrief- Exit Ticket) lesson in the allocated time with fun and creative strategies to infuse all components of the curriculum design in meaningful ways.
- Teachers by grade level took a deep dive into the scenario and dissected the lesson's exit ticket according to the curriculum guide to ensure adherence and objective goals were met within the allotted time. Teachers used the lesson planning and customization sheets to identify key materials needed to address or include in flow and next steps proactively.
- Teachers listed the use of classroom timers, effective planning based on the possible use of the assessment data strategy, teacher training and expertise,

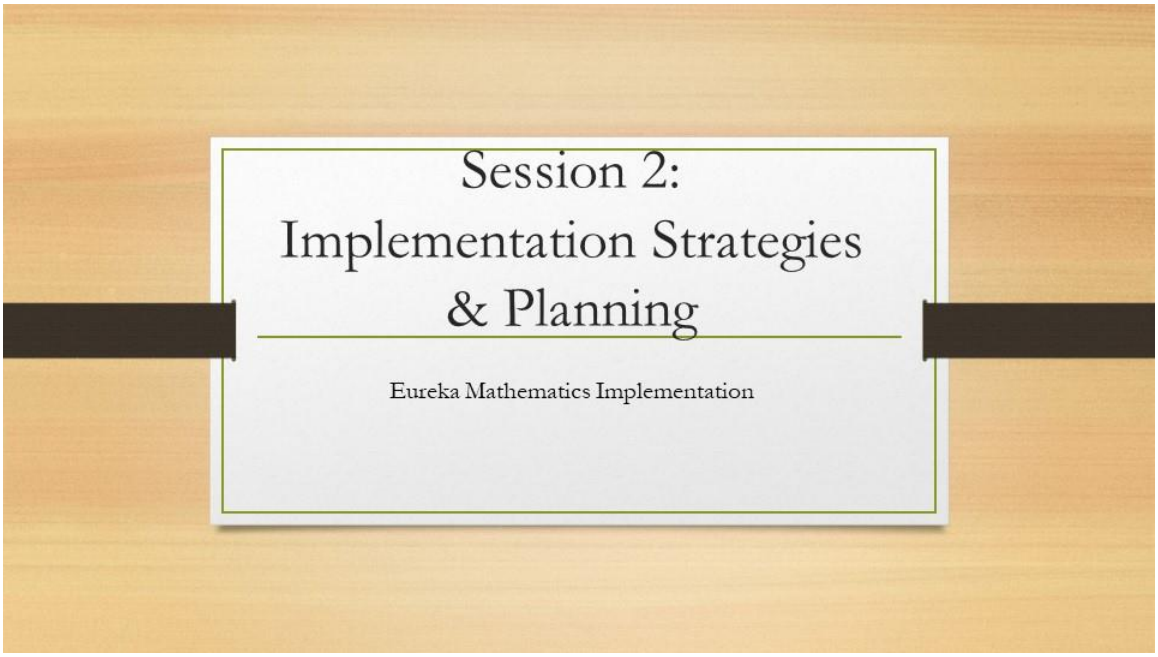
classroom jobs, clear expectations, and nonverbal signals and actions for both teacher and students.

- Teachers were encouraged to raise concerns about issues that continuously plague the classrooms at XYZ elementary. They mentioned issues of aggressive student behaviors, student frustration levels, issues with special education students, and the lack of measures built into Eureka's curriculum to address those areas of concern.
- Teachers identified continuing hinderances (e.g., some progress in the mathematics instructional processes related to time and student success). Then, using the planning ideas, teachers connected the correlating resoulutions as an actionable item for their teacher toolbox.
- Teachers completed an exit/evaluation ticket to determine the impact on teacher potential implementation changes and shared feedback via message boards.

Project PowerPoint Slides

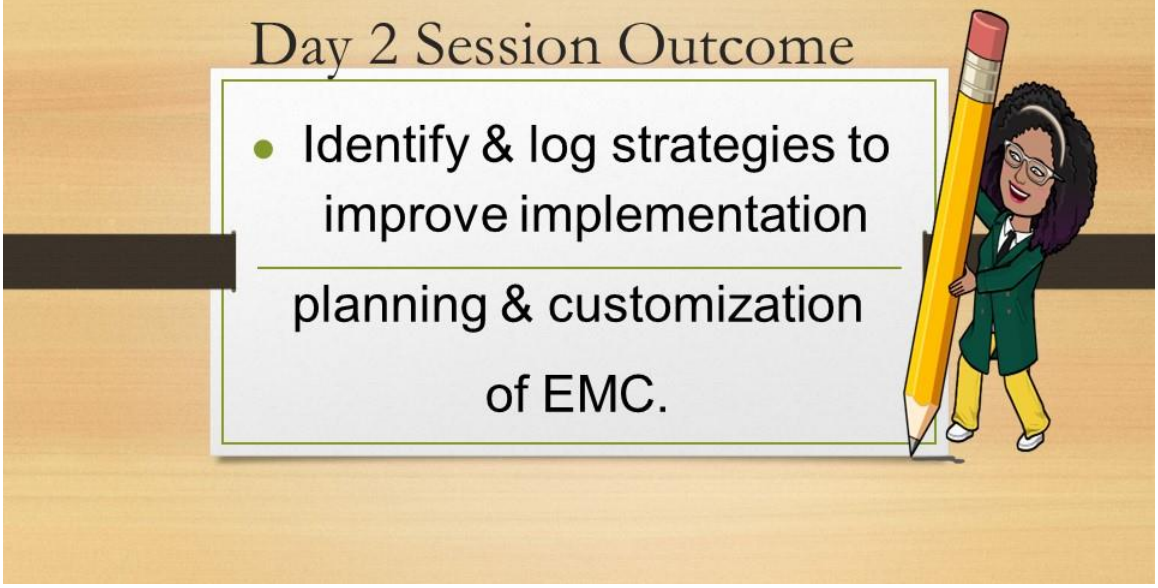
Day Two





Day 2 Session Outcome

- Identify & log strategies to improve implementation planning & customization of EMC.



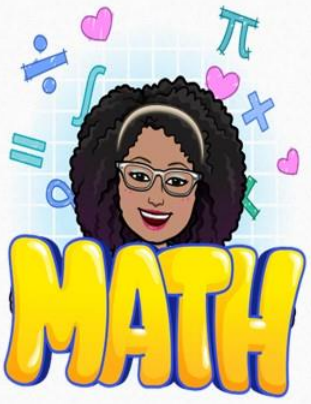
Let's Pop our K.O.R.N with Padlet

K.O.R.N. Handout

K- I know…..	O- My Opinions…..
R- I Realized….	N- New Ideas…..

EMC Scenarios & Strategies

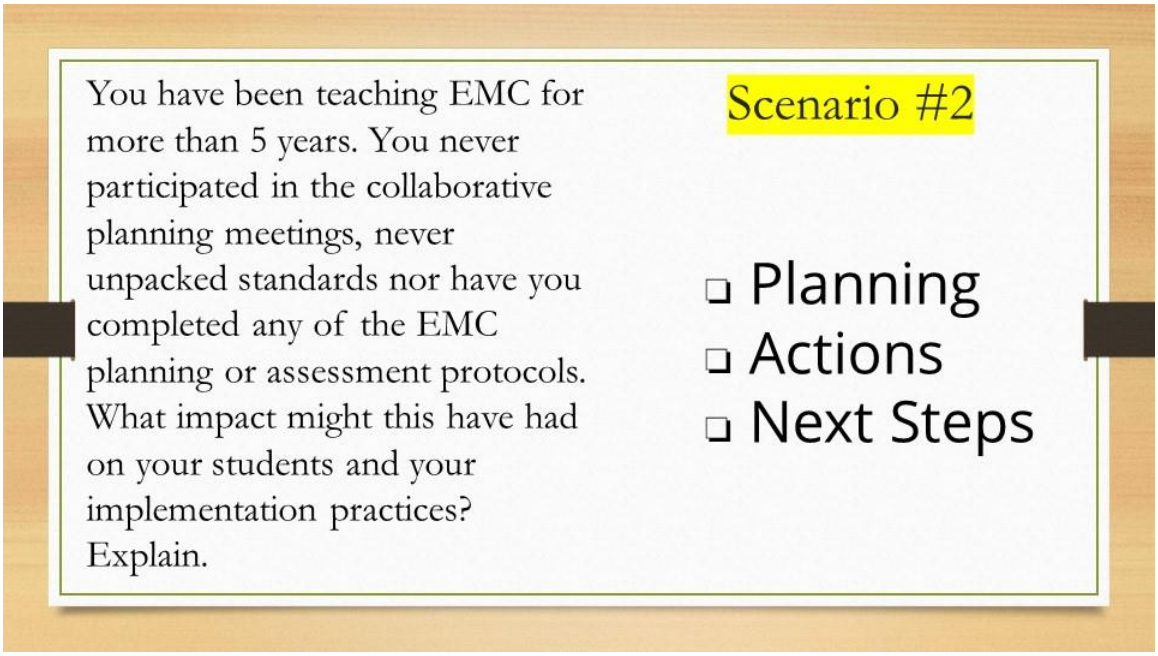
- Read
- Discuss
- Plan
- Share

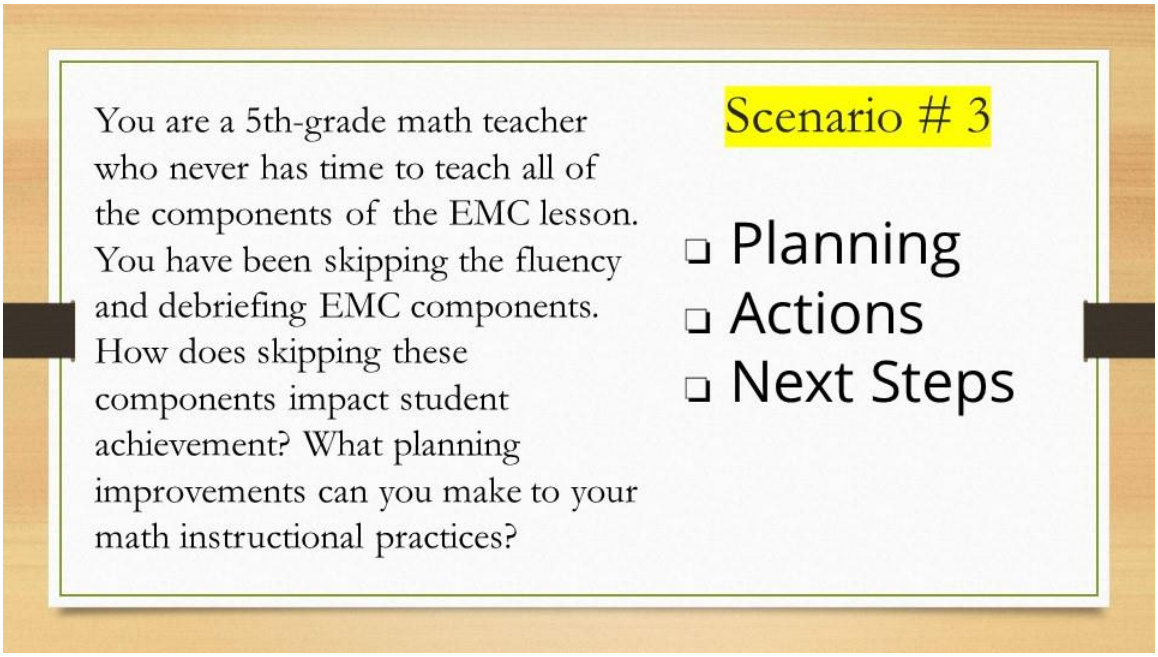


75% of your first-grade class did not attend virtual school. The beginning of the year data shows they are well below. How will you plan to meet the needs of this class? Which web 2.0 tool shared will best support these learners? Explain.

Scenario # 1

- ❑ Planning
- ❑ Actions
- ❑ Next Steps


You have been teaching EMC for more than 5 years. You never participated in the collaborative planning meetings, never unpacked standards nor have you completed any of the EMC planning or assessment protocols. What impact might this have had on your students and your implementation practices? Explain.
Scenario #2
Planning
Actions
Next Steps


You are a 5th-grade math teacher who never has time to teach all of the components of the EMC lesson. You have been skipping the fluency and debriefing EMC components. How does skipping these components impact student achievement? What planning improvements can you make to your math instructional practices?
Scenario # 3
Planning
Actions
Next Steps

Scenario # 4

This is your 10th year teaching fourth-grade math. The fluency portions of the EMC lessons are not motivating your students. What resources or strategies explored can be added to meet the needs of this class? Explain your selection.

- ❑ Planning
- ❑ Actions
- ❑ Next Steps

Scenario # 5

As a grade level, you and your teammates have taught the EMC lessons explicitly and there is still 85% of grade level scoring well below on every exit ticket. What strategies explored can support this grade level? What will be the next steps for this team? Explain.

- ❑ Planning
- ❑ Actions
- ❑ Next Steps

Scenario # 6

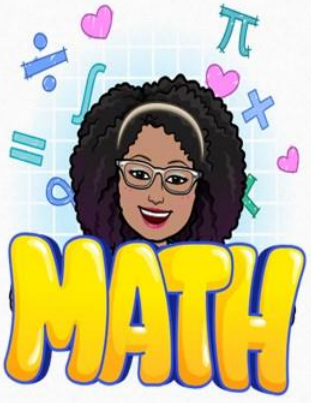
Every EMC Lesson you instruct has 90% of your class perform at or above the anticipated proficiency level. What planning structures explored will support your math instruction? Explain the next steps for this class.

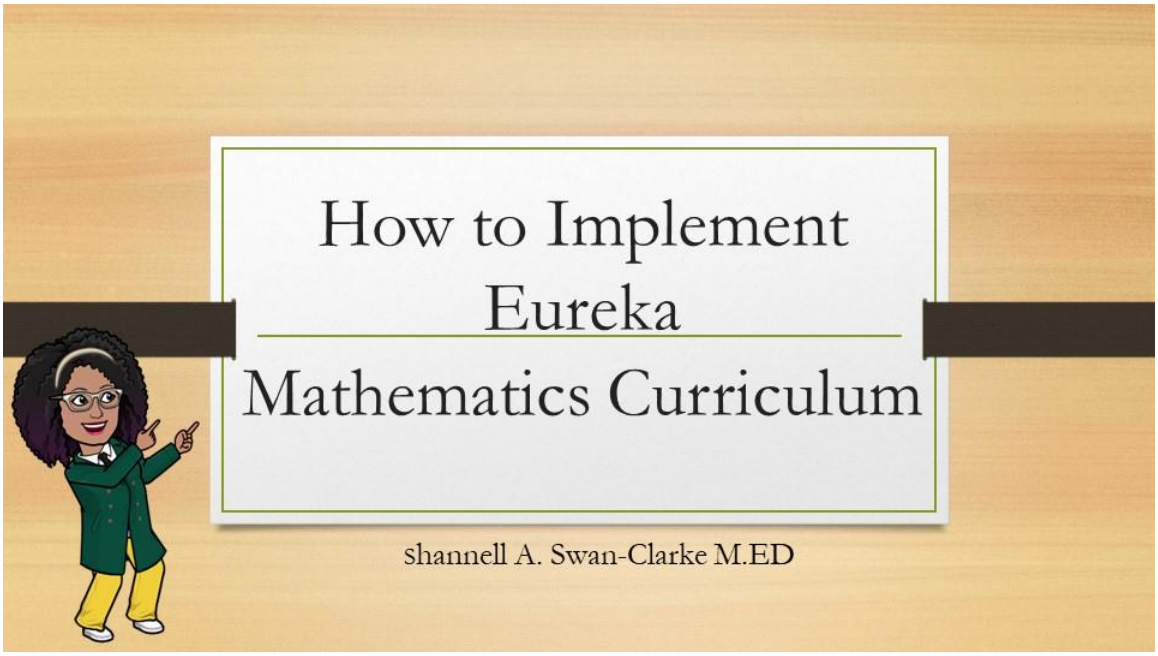
- ❑ Planning
- ❑ Actions
- ❑ Next Steps

EMC Scenarios & Strategies

Let's Reflect & Evaluate our scenarios & ideas.

Feedback & Discussions

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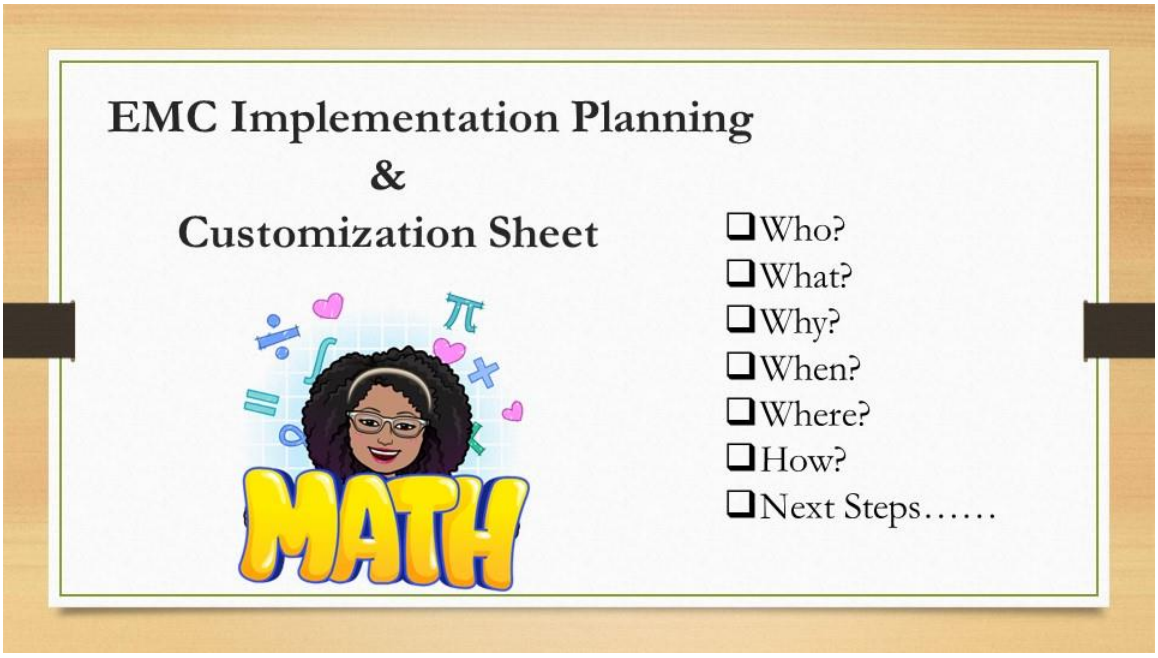

EMC Implementation Planning
&
Customization Sheet
MATH
Who?
What?
Why?
When?
Where?
How?
Next Steps……

EMC Sample Assessment Data

- Trends
- Strengths
- Weaknesses
- Trouble spots
- Standards
- Profile
- Proficiency
- Next Steps….

Unpacking Standards Knowledge & Skills

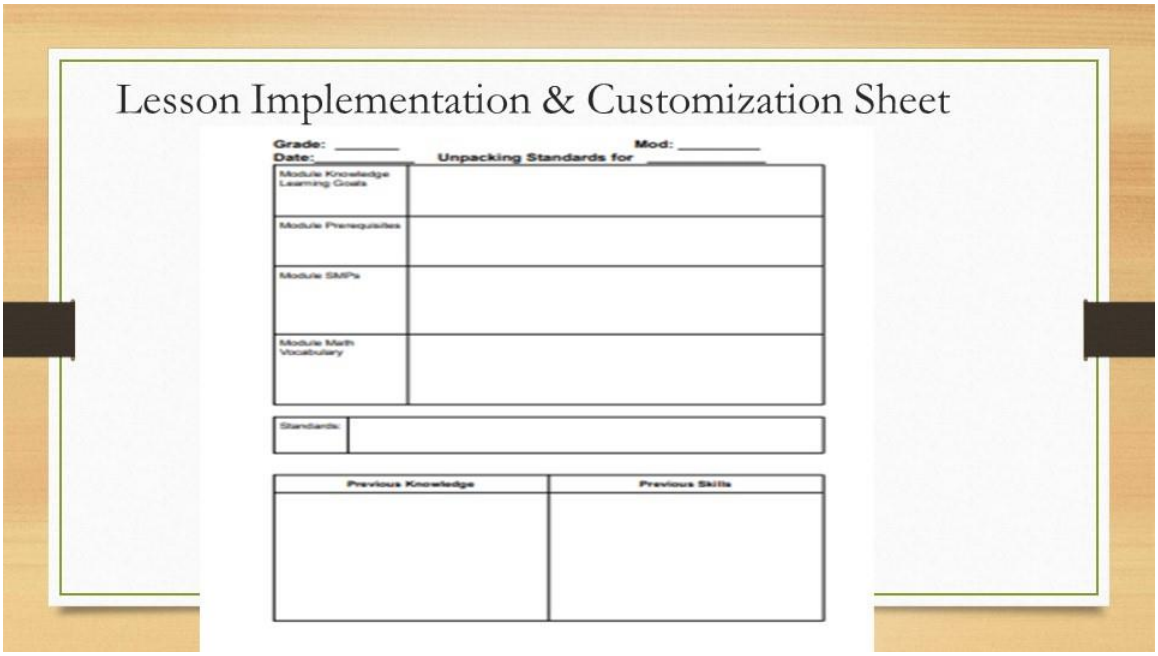
Steps to Unpacking

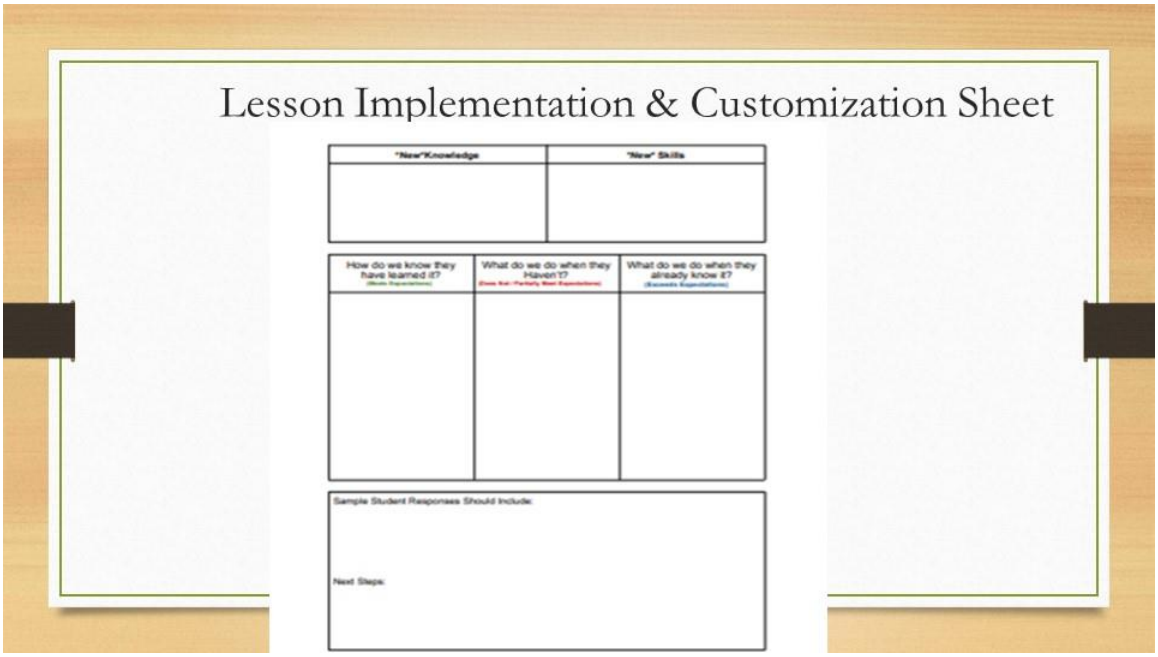
- Read the standard
- Circle Nouns
- Underline Verbs
- Relate the context
- Reference standard progression

Lesson Implementation Planning & Customization Sheet Considerations

- Historical Data Analysis
- Assessment Data Analysis
- Focusing/ Continuing Standards
- Prerequisite Planning
- Grade Level Planning
- Grade Level Progression Planning

Lesson Planning & Customization Sheet Demo


Lesson Implementation & Customization Sheet
Grade: _____
Mod: _____
Date:
Unpacking Standards for _____
Module Knowledge Learning Goals
Module Prerequisites
Module SMPs
Module Math Vocabulary
Standards:
Previous Knowledge
Previous Skills


Lesson Implementation & Customization Sheet
"New" Knowledge
"New" Skills
How do we know they have learned it?
What do we do when they Haven't?
What do we do when they already know it?
Sample Student Responses Should Include:
Next Steps:


EXIT
TICKET
1460
Exit Ticket
•Please complete the exit ticket before you leave.
Thank you!

Day 2 Handouts

Lesson Planning and Customization Planning Sheet (see pp. 96, 116)

Grade: _____ Mod/ Lesson: _____ Date: _____

Lesson Implementation & Customization Planning Sheet

Module Content Knowledge Goals/ Objective:	
Module Prerequisites:	
Module Data Analysis Trends/ Student Groups	
Module Math Vocabulary:	

Focusing Content Standard (S):	

Previous Content Standard Knowledge	Previous Content Standard Skills

How do we know *if* they have learned previous content standard knowledge and skills? **(Meets Expectations)**	What do we do *if* they Haven't learned previous content standard knowledge and skills? **(Does Not / Partially Meet Expectations)**	What do we do when they *already know* previous content standard knowledge and skills? **(Exceeds Expectations)**

Previous Mathematics Content Standards Knowledge & Skills Curriculum Aligned Resources:

New **Content Standard Knowledge**	***New*** **Content Standard Skills**

How do we know they have learned new content standard knowledge and skills? **(Meets Expectations)**	What do we do when they Haven't learned new content standards, knowledge and skills? **(Does Not / Partially Meet Expectations)**	What do we do when they already know new content standards, knowledge and skills? **(Exceeds Expectations)**

New Mathematics Content Standard Knowledge & Skills Curriculum Aligned Resources:

Sample Student Responses Should Include: Next Steps:

SAMPLE Lesson Planning and Customization Planning Sheet

Grade: 2nd Mod/ Lesson: M6 - L5
Lesson Implementation & Customization Planning Sheet

Module Content Knowledge Goals/ Objective:	Compose arrays from rows and columns and count to find the total using objects. Standards of Mathematical Practices : MP.3 | MP.4 | MP.7 | MP.3
Module Prerequisites:	• making equal groups using concrete materials • learning to manipulate a given number of objects to create equal groups • circling a group of 5 stars, adding 5 more, and then adding 5 more. • determine the total and relate their drawings to the corresponding repeated addition equation • calculate the repeated addition sums by adding on to the previous addends, step-by-step, or by grouping the addends into pairs and adding. • draw abstract tape diagrams to represent the total and to show the number in each
Module Data Analysis Trends/ Student Groups	Meets: *Kaylen, Jordan, Malik* Partially Meets: *Caleb, Kaiden, Tyrell, Victor, De'Ivyon, Blake B., Blake C., Jamari* Exceeds: *Aqeelah, Dustin, Markel, Special, Cayden, La'Bria, Mia, Khai*
Module Math Vocabulary:	-Array, arrange, rows, columns, objects, equal, unequal, even, odd, groups, members, multiply, repeated addition, whole, part, multiplier, multiplicand, total, left, right. -Sample Phrases: draw columns of 2, redraw rows of 5, Circle groups of 3, draw/ circle 2 equal columns, ring rows.

Focusing Content Standard (S):	• Geometry 2.G.A.2 • Operations & Algebraic Thinking 2.OA.A.1 | 2.OA.C.3 | 2.OA.C.4 • Reason with shapes and their attributes. 2.G.A.2

	• Represent and solve problems involving addition and subtraction. 2.OA.A.1 • Work with equal groups of objects to gain foundations for multiplication. 2.OA.C.3 | 2.OA.C.4

Previous Content Standard Knowledge	Previous Content Standard Skills
• learning to manipulate a given number of objects to create equal groups • relate pictorial representations where they may begin by circling a groups (adding more / less) • determine the total and relate their drawings to the corresponding repeated addition equation • understanding that any unit may be counted focuses on the manipulation of place value units	• making equal groups using concrete materials • create pictorial representations of equal groups and arrays • calculate the repeated addition sums by adding on to the previous addends or by grouping the addends into pairs and adding • draw abstract tape diagrams to represent the total and to show the number in each group as a new unit

How do we know *if* they have learned previous content standard knowledge and skills? **(Meets Expectations)**	What do we do *if* they Haven't learned previous content standard knowledge and skills? **(Does Not / Partially Meet Expectations)**	What do we do when they *already know* previous content standard knowledge and skills? **(Exceeds Expectations)**
70% Mastery on Previous Lesson's Exit Ticket Small Group / Reteach/ Personalized Learning Activities on applicable Knowledge (Skills as needed): • Math Vocabulary & Phrases	60% and below Mastery on Previous Lesson's Exit Ticket. Small Group / Reteach/ Personalized Learning Activities on applicable Skills:	90% -100% Mastery on Exit Ticket Small Group/ Extension / Personalized Learning Activities: • Zearn Mission 6

• Representations of Arrays • Tape Diagrams • Zearn Missions 3,4,5	• Math Vocabulary & Phrases • Skip Counting • Composing & decomposing numbers • Zearn Missions 1,3,4,5	• Build Array City • Array Games

Previous Mathematics Content Standards Knowledge & Skills Curriculum Aligned Resources:

Math Fact Fluency- XtraMath.org by assigned proficiency levels.

- Zearn Mission 1: Number & Operations in Base Ten 2.NBT.A.2 | 2.NBT.B.6
- Zearn Missions 4-5: Operations & Algebraic Thinking 1.OA.D.7
- Zearn Mission 3: Understand place value.2.NBT.A.2
- Zearn Mission 3:Use place value understanding and properties of operations to add and subtract. 2.NBT.B.6
- Zearn Missions 3-5 Work with addition and subtraction equations. 1.OA.D.7

New **Content Standard Knowledge**	***New*** **Content Standard Skills**
• Knowing each a row or column is seen as the new unit being counted. • one row or one column at a time and express the total via repeated addition equations (**2.OA.C.4**). • As they compose and decompose arrays, students create different number sentences yielding the same total (e.g., 5 + 5 + 5 = 15 and 3 + 3 + 3 + 3 + 3 = 15). • students move to the pictorial level to represent arrays and to distinguish rows from columns	• students organize the equal groups and create arrays • use manipulatives to compose up to 5 by 5 arrays • students might arrange one column of 5 counters, then another, and then another to compose an array of 3 columns of 5, or 15 counters. • compose and decompose arrays/ tape diagrams with objects, pictures or creating their own interpretations. • find total number of objects in each array • skip counting, counting on from left to right. “Three plus 3

by separating equal groups horizontally and vertically. • use same-size square tiles, moving them closer together in preparation for composing rectangles • using tape diagrams to represent array situations and the RDW process to solve word problems.	is 6. Six plus 3 is 9. Nine plus 3 is 12."

How do we know they have learned new content standard knowledge and skills? (Meets Expectations)	What do we do when they Haven't learned new content standards, knowledge and skills? (Does Not / Partially Meet Expectations)	What do we do when they already know new content standards, knowledge and skills? (Exceeds Expectations)
70% Mastery on Exit Ticket Small Group / Reteach/ Personalized Learning Activities on applicable Knowledge (Skills as needed): • Math Vocabulary & Phrases • Representations of Arrays • Tape Diagrams • Zearn Missions 3,4,5 With Success: • Zearn Mission 6 • Build Array City • Array Games	60% and below Mastery on Exit Ticket. Small Group / Reteach/ Personalized Learning Activities on applicable Skills: • Math Vocabulary & Phrases • Skip Counting • Composing & decomposing numbers • Zearn Missions 1,3,4,5 With Success move to Reteaching Knowledge. • Math Vocabulary & Phrases • Representations of Arrays • Tape Diagrams	90% -100% Mastery on Exit Ticket Small Group/ Extension / Personalized Learning Activities: • Zearn Mission 6 • Build Array City • Array Games

New Mathematics Content Standard Knowledge & Skills Curriculum Aligned Resources: • Zearn Missions 1,3,4,5,6 • XtraMath.org Fact Fluency (Teacher Assigned by individual student's Math Proficiency Grade level) • Build Array City • Array Games		
Sample Student Responses Should Include: • Student created representations of Equal Arrays • Repeated Addition / Skip Counting to find Totals • Circling/ ringing of equal groups Next Steps: • Facilitate Planning & Groupings for Eureka Lesson 6 • Continue with Zearn Focus Mission 6 Lessons		

Day Two Handouts

Scenario Cards (see p. 111)

Scenario #1	Scenario #2	Scenario #3
75% of your first-grade class did not attend virtual school. The beginning of the year data shows they are well below. How will you plan to meet the needs of this class? Which web 2.0 tool shared will best support these learners? Explain.	You have been teaching EMC for more than 5 years. You never participated in the collaborative planning meetings, never unpacked standards nor have you completed any of the EMC planning or assessment protocols. What impact might this have had on your students and your implementation practices? Explain.	You are a 5th-grade math teacher who never has time to teach all of the components of the EMC lesson. You have been skipping the fluency and debriefing EMC components. How does skipping these components impact student achievement? What planning improvements can you make to your math instructional practices?

Scanario #4	Scenario #5	Scenario #6
This is your 10th year teaching fourth-grade math. The fluency portions of the EMC lessons are not motivating your students. What resources or strategies explored can be added to meet the needs of this class?Explain your selection.	As a grade level, you and your teammates have taught the EMC lessons explicitly and there is still 85% of grade level scoring well below on every exit ticket. What strategies explored can support this grade level? What will be the next steps for this team? Explain.	Every EMC Lesson you instruct has 90% of your class perform at or above the anticipated proficiency level. What planning structures explored will support your math instruction? Explain the next steps for this class.

Note. *Scenario cards created by Mathematics Coach/facilitator

Daily Session Agenda

Day 3: Best Practices Review & Collaborative Planning

8:00 AM - 9:00 AM	Best Practices Collaboration Cont'd & Session Feedback (Padlet/Paper)
9:00 AM - 10:00 AM	Review Session Content Aligned Tools & Resources, Using Assessments as a Strategy and Eureka Implementation
10:00- 10:15	BREAK
10:15 AM - 11:15 AM	Collaborative Planning (EMC Aligned Tools & Resources)
11:15 AM- 12:00 PM	Collaborative Planning (EMC Assessment Data)
2:00 PM- 1:00 PM	Lunch
1:00 PM - 2:00 PM	Collaborative Planning (EMC Lesson Implementation)
2:00 PM- 3:00 PM	Actionable -Next Steps
3:00 PM - 3:30 PM	Closing- Exit Survey (Electronic/Paper)

Day 3 Professional Development: Best Practices & Collaborative Planning

Mathematics Coach's Notes

- Teachers reviewed the actions in the classroom scenarios (from cards in Appendix A) of professional learning communities, student debriefing /intervention, and small group instructional practices.
- Mathematics Coach mentioned professional learning communities demonstrate ways mathematics teachers collaboratively review student data and work samples from individual classes and student levels as advised by Great Minds (Great Minds, 2019) utilizing the facilitator-created Lesson Implementation and Customization Sheet.
- Mathematics Coach used assessment data sources from exit ticket samples (teachers are encouraged to use their existing quizzes or exit tickets as samples) shared in the previous session to apply planning and data analysis practice on the

Facilitator cresated Lesson Implementation and Customization Planning Sheet. Facilitator demonstrated how to use color coding or listing for student profiles or proficiencies, student groupings, and trends found in applied standards via unpacking.

- Mathematics Coach related to unpacking standards and analyzing assessment samples how they can inform and evaluate planning and next steps on the facilitator-created Lesson Implementation and Customization Planning Sheet. Mathematics coach reviewed circling verbs, underlining nouns, and identifying content for unpacking standards. This activity is followed with identifying the standards and progression or prerequisites needed for each sample assessment.
- Mathematics Coach mentioned the work that cross-examines, develops, and discusses rubrics and possible misconceptions in the implementation.
- Mathematics Coach specified how the information then drives the next steps to plan to address the areas of concern at it applied within the most appropriate setting (e.g., whole group or small group intervention) on the Lesson Implementation and Customization Sheet.
- Mathematics Coach explored concept of data-driven student intervention and small group discussions to further expose the participants to possibilities for maximizing time and value when meeting the needs of desired student outcomes in mathematics that teachers record on the lesson implementation and customization sheet. It, too, reinforced continued active use of the standard proficiency log that logs varied levels and mastery of the class.

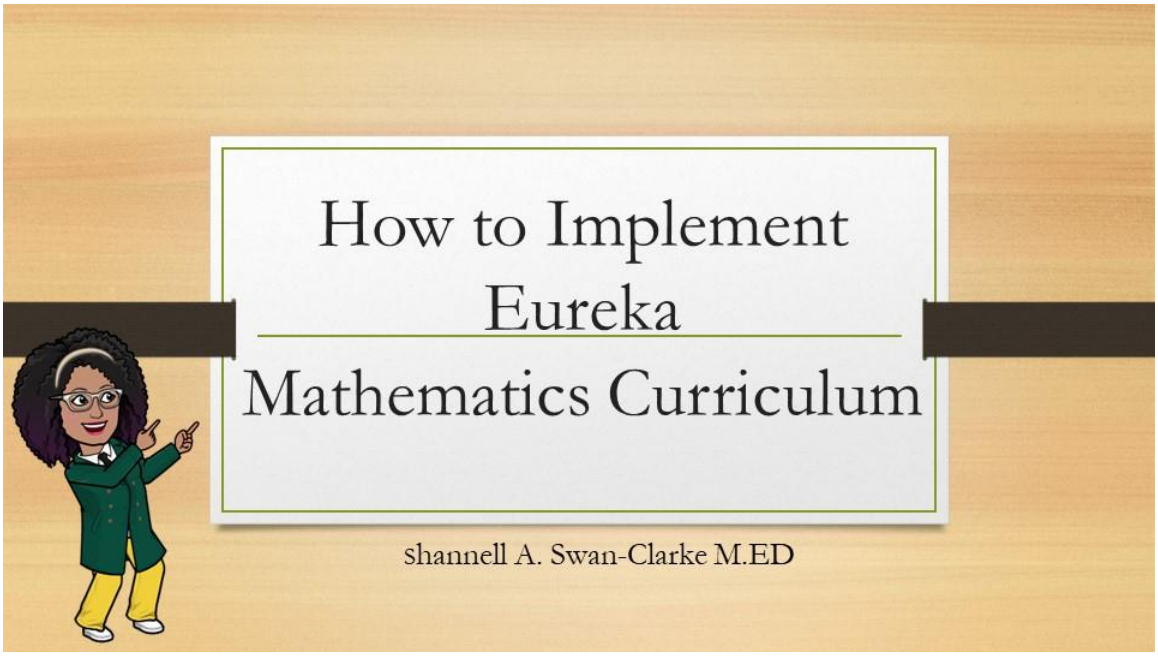
- Teachers shared ideas on discussed roles and structures implemented within the timeframes of the mathematics components based on shared experiences. Facilitator promoted peer support and checked for understanding and collaborative planning and toolboxes as possible ways to provide intent to the implementation of those structures.
- Mathematics Coach provided opportunities for teachers to strategize how to incorporate the assessment data analysis, critical thinking, and collaborative planning insights from the previous sessions and from the Lesson Implementation and Customization Sheet.
- Mathematics Coach revisited the scenarios presented to teachers and then reflected on aligning resources, standards, and goals to the purposes of lessons/mini outlined in the curriculum onto the lesson implementation and customization planning sheet.
- Mathematics Coach restated the justification aimed to address the data-based deficits or errors students face when developing and completing the Lesson Implementation and Customization Planning Sheet.
- Teachers participated in the wrap-around thoughts through collaborative planning and assessment data analysis. Teachers tried to identify and compare strategies that can improve their current practices with the interactions in student groups and intervention as anticipated.
- Teachers reflected on the incorporation of collaborative planning, new tools, and time management skills that may help to inform how teachers and lead teachers

interact with their colleagues and students in more meaningful and purposeful ways.

- Teachers completed an exit/evaluation ticket to determine the impact of teacher potential implementation changes and shared final feedback via message boards.

Project PowerPoint Slides

Day Three


How to Implement
Eureka
Mathematics Curriculum
shannell A. Swan-Clarke M.ED


Session 3:
Collaborative Planning
Eureka Mathematics Implementation

Day 3 Session Outcome

- Collaboratively plan with curriculum aligned resources, tools, assessment data analysis, and customization sheets for improved implementation of Eureka Mathematics.

Let's Pop our K.O.R.N with Padlet

K.O.R.N. Handout

K- I know…..	O- My Opinions…..
R- I Realized….	N- New Ideas…..

Collaborative Planning

- Structure
- Protocols
- RTI
- Accountability
- Evaluations
- Next Steps

Collaborative Planning Assessment Data Analysis

- Trends
- Strengths
- Weaknesses
- Trouble spots
- Embedded Standards
- Prerequisites
- Needs Assessment

EMC Strategies & Techniques

- Analyzing Assessment Data
- Small Group Instruction
- One on One Instruction

Student Samples Implementation & Planning

- ❑ Planning/Training
- ❑ Materials
- ❑ Purpose / Goals
- ❑ Actions (student & Teacher
- ❑ Takeaways/ Next Steps

Exploring Simulated Classroom Data

Collaborative Planning Data Analysis Profile Sheet

- Class Mastery
- Student Profile
- Standards Based
- Differentiating
- Prerequisites

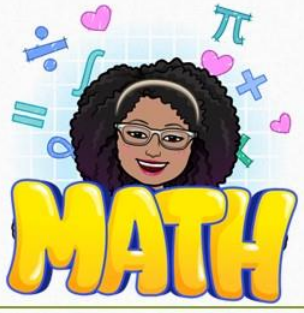
Sample Mathematics Content Knowlegde Profile Checklist (see page:96)

Student	Standard #	Standard #	Standard #	Standard #	Standard #	Standard #	Standard #	Standard #
Totals								

Using Assessment Data as a Strategy

- Planning
- Actions
- Next Steps

EMC Implementation Planning & Customization Sheet



- Who?
- What?
- Why?
- When?
- Where?
- How?
- Next Steps……

CollaborativeUnpacking Standards Knowledge & Skills

Steps to Unpacking

- Read the standard
- Circle Nouns
- Underline Verbs
- Relate the context
- Reference standard progression

Collaborative: Planning & Customization Sheet

Grade: _____ Mod: _____
Date: _____ Unpacking Standards for _____

Module Knowledge Learning Goals	
Module Prerequisites	
Module SMPs	
Module Math Vocabulary	
Standards:	

Previous Knowledge	Previous Skills

Collaborative: Planning & Customization Sheet

"New" Knowledge	"New" Skills

How do we know they have learned it?	What do we do when they Haven't?	What do we do when they already know it?

Sample Student Responses Should Include:

Next Steps:

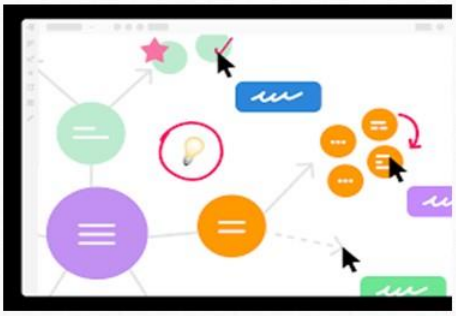
Planning Outcomes & Reflections

Collaborative Planning: Sample Rubric

Not Yet Proficient 1 Point	Partially Proficient 2 Points	Proficient 3 Points	Highly Proficient 4 Points
Mathematical representations of the problem were incorrect. 2. The wrong information was used in trying to solve the problem. 3. The mathematical procedures used would not lead to a	Choice of terms to represent the problem was inefficient or inaccurate. 2. Some, but not all of the relevant information from the problem was used. 3. The mathematical	1. Choices of mathematical representations of the problem were appropriate. 2. Relevant information from the problem was used in the solution. 3. Mathematical procedures selected	1. Choice of mathematical representations helped clarify the problem's meaning. 2. Hidden or implied information not readily apparent was uncovered and used in problem solving. 3.

Collaborative Planning Resources

- Affirm
- Equip
- Zearn
- Goformative
- Xtramath
- Padlet
- Assistments
- Interactive Math Tools



Collaborative Planning, Reflections & Exploration

Eureka Mathematics Implementation

Planning, Next Steps & Closing

- Teacher Skills & Knowledge
- Student Skills & Knowledge


EXIT
TICKET
1460
Exit Ticket
•Please complete the exit ticket before you leave.
Thank you!

Day 3 Handouts

Sample Exit Ticket Rubric- Mathematics (see p. 125)

Not Yet Proficient 1 Point	Partially Proficient 2 Points	Proficient 3 Points	Highly Proficient 4 Points
Mathematical representations of the problem were incorrect. 2. The wrong information was used in trying to solve the problem. 3. The mathematical procedures used would not lead to a correct solution. 4. Mathematical terminology was used incorrectl	Choice of terms to represent the problem was inefficient or inaccurate. 2. Some, but not all of the relevant information from the problem was used. 3. The mathematical procedures used would lead to a partially correct solution. 4. Mathematical	1. Choices of mathematical representations of the problem were appropriate. 2. Relevant information from the problem was used in the solution. 3. Mathematical procedures selected would lead to a correct solution. 4. Mathematical terminology was used correctly.	1. Choice of mathematical representations helped clarify the problem's meaning. 2. Hidden or implied information not readily apparent was uncovered and used in problem solving. 3. Mathematical procedures were selected that would lead to an accurate solution. 4.

	terminology was used imprecisely.		Mathematical terms were precise.

Sample Mathematics Content Knowlegde Profile Checklist (see page:96)

Student	Standard #	Standard #	Standard #	Standard #	Standard #	Standard #	Standard #	Standard #
Totals								

Sample Prerequisite Mathematics Assessment Analysis (See page:101)

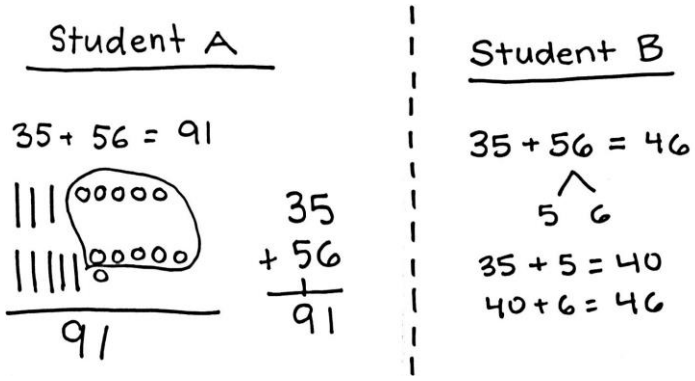
Essential Foundational Knowledge	Assessment Item	Observations Assessment Item	Supporting Content	When is this knowledge needed?
A. Tell time to the nearest minutes	1	Observation A	Supporting Lesson A G2 M8 L14	Grade 3 Mod2 Lesson 3
B. Place numbers on a numberline.	2	Observation B	Supporting Lesson B G2 M7 L21 Tell time on a clock	Grade 3 Mod 2 Lesson 2
C. Skip Count by 3s	3	Observation C	Group Counting	Grade 3 Mod 2 Lesson 8

Eureka Mathematics Sample Exit Tickets

Sample Exit Ticket Lesson 18 (1st Grade)

Name _____ Date _____

Circle the work that is correct.
In the extra space, correct the mistake in the other solution using the same solution strategy the student tried to use.



Sample Exit Ticket Lesson 2 (3rd Grade)

Demonstrate on the numberline below the time an Art class that begins a drawing project at 10:00 p.m. and ends at 11:00 p.m. Use a number line to answer the following questions.

b. What time do students begin the drawing project?

c. What amonut of time do students take to complete the drawing?

Sample Exit Ticket Lesson 19 (4th Grade)

Use the RDW process to solve.

1. Mrs. Smooth took her bird to the vet. Sweety weighed $6\frac{3}{10}$ pounds. The vet said that Sweety weighed $1\frac{4}{10}$ pound more last year. How much did Sweety weigh last year?

Read	Write	Draw

Exit Ticket Handout (Paper)

1.What additional professional development support will you need to improve your EMC implementation practices?

2.What Key element today will positively impact your implementation of the Eureka Mathematics Curriculum?

3. How prepared to you feel to plan and implement the key element you identified in question 2?

1 Prepared

2 Somewhat prepared

3 Prepared

4 Unprepared

4.Did this professional development help to inform your overall implementation of the Eureka Mathematics Curriculum? Explain.

Exit Ticket (Electronic)

What additional professional development support will you need to improve your EMC implementation practices? *

Your answer

What Key element today will positively impact your implementation of the Eureka Mathematics Curriculum? *

Your answer

*

How prepared to you feel to plan and implement the key element you identified in question 2?

	1	2	3	4	
Prepared	○	○	○	○	Unprepared

Did this professional development help to inform your overall implementation of the Eureka Mathematics Curriculum? Explain. *

Your answer

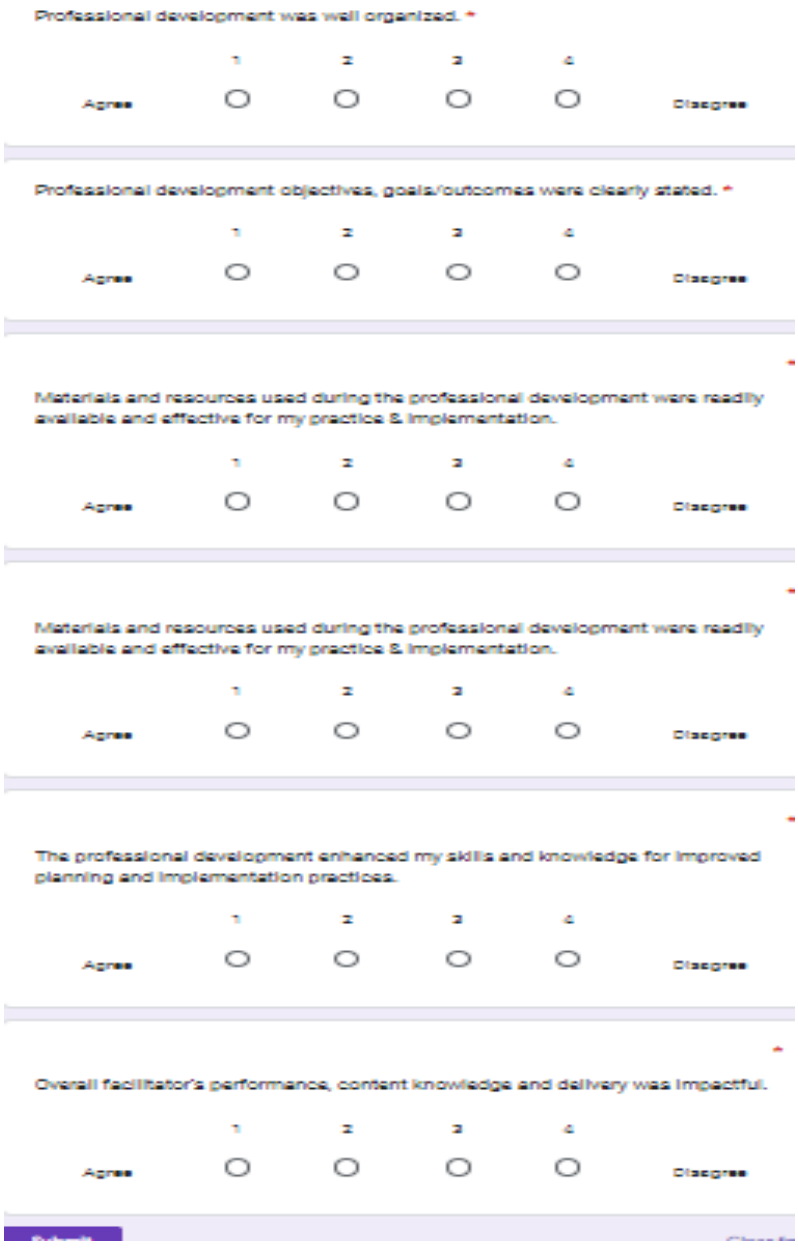
Submit

Clear form

Professional Development Exit Survey (Paper)

Question	Rating 1-Agree 2- Somewhat agree 3-Neutral 4-Disagree
Professional development was well organized.	1 2 3 4
Professional development objectives, goals/outcomes were clearly stated.	1 2 3 4
Materials and resources used during the professional development were readily available and effective for my practice & implementation.	1 2 3 4
The professional development enhanced my skills and knowledge for improved planning and implementation practices.	1 2 3 4
Overall facilitator's performance, content knowledge and delivery was impactful.	1 2 3 4

Professional Development Electronic Survey



Professional development was well organized. *

	1	2	3	4	
Agree	○	○	○	○	Disagree

Professional development objectives, goals/outcomes were clearly stated. *

	1	2	3	4	
Agree	○	○	○	○	Disagree

*

Materials and resources used during the professional development were readily available and effective for my practice & implementation.

	1	2	3	4	
Agree	○	○	○	○	Disagree

*

Materials and resources used during the professional development were readily available and effective for my practice & implementation.

	1	2	3	4	
Agree	○	○	○	○	Disagree

*

The professional development enhanced my skills and knowledge for improved planning and implementation practices.

	1	2	3	4	
Agree	○	○	○	○	Disagree

*

Overall facilitator's performance, content knowledge and delivery was impactful.

	1	2	3	4	
Agree	○	○	○	○	Disagree

Appendix B: Interview Protocol Form

- What is your philosophy of teaching/ important lessons learned in your professional experiences as a teacher?
- How long have you been teaching?
- Which sector(s) have you taught/ teach in?
- Which grade level(s) have you taught/ teach?
- What do you think are the reasons for our low student achievement scores in Math?

Interview Questions Part 2: Participant Math Teaching Profile

- How long have you been teaching Math?
- What other Math Curricula have you had experiences/ Training with?
- How do the other Math Curricula compare to Eureka?
- Are you mandated to teach Eureka Math Curriculum?
- Do you like teaching Eureka Mathematics Curriculum? Explain.
- What type/ level of math learner do you think Eureka Mathematics Curriculum targets?
- Which tools do you currently use ex: worksheets/ reproducible, web 2.0 tools, workbooks, or any other resources to teach Eureka Math's Curriculum? Why?
- What planning system to utilize to support your implementation of the Eureka Mathematics Curriculum? Explain the challenges and/or successes.

- What forms of training if any have you had to improve teacher knowledge, proficiency, or reflective practices with the Eureka Math Curriculum?

- What student-based reasoning Professional developments connected to Eureka Mathematics Curriculum implementation have you been offered or participated in?

- Identify and explain the rationale of the approaches you have used most in your implementation practices. (Ex: web 2.0) tools, multi-sensory location, Art Integration, Small group intervention, Real-World Problem Solving, STEM, Peer Coaching, Student-led activities)

- How long have you taught Eureka Math Curriculum?

- How have you implemented the Eureka Math Curriculum? Why?

- How have you utilized targeted intervention? Why or why not?
- How do you implement and evaluate the effectiveness of your small group intervention practices? If applicable, Explain.
- Does the Eureka Mathematics Curriculum provide opportunities to infuse/extend mathematics into solving real-world or local problems? Explain.
- What concerns do you have with teaching the Eureka Mathematics Curriculum?
- What challenges do you perceive in the implementation of the Eureka Mathematics Curriculum?
- What advantages do you perceive in the implementation of the Eureka Mathematics Curriculum?
- What resources do teachers need to improve and maintain the implementation of the Eureka Mathematics Curriculum
- How many components are in the Eureka Math Lessons?

List 0-1	List 1-2	List 3-4	List 4	Listed non components

Interview Questions Part 3: Participant Experiences and Review of the Math Curriculum Profile

- What does each component mean to you? Explain.
- Did you teach Eureka Math Curriculum in the past?

Which Component(s)

Fluency	Concept Development	Application Problems	Student Debrief

Do you currently teach Eureka Math Curriculum?
Which Component(s)

Fluency	Concept Development	Application Problems	Student Debrief

- Which component(s) of the lessons do you feel are most beneficial for your learners? Explain.

Fluency

Concept Development

Application Problems

Student Debrief

- What component (s) of the lessons do you feel are not beneficial for your learners? Explain.

Fluency

Concept Development

Application Problems

Student Debrief

- What type of learner/level do you feel each component (s) of the lessons is designed to address? Explain.

- How do teachers implement the Eureka Mathematics Curriculum to improve students' mathematics outcomes?

- What do you need to improve your students' math scores?

- What do you think your students need to improve their math scores?
- What do you think your parents need to improve their child's math scores?
- What do you think this district should do to improve its math scores?
- What do you think teachers need to commit to when teaching any curriculum?

Ideas/ Recommendations Check all that apply:

- ❑ Daily Administrative Checks/Consistent Informal Observations
- ❑ Confidence in Curriculum/Inclusion in Curriculum Selection process
- ❑ Differentiated Teacher & Differentiated Student Options
- ❑ Special Education Component
- ❑ Technological Support options (Web 2.0 Tools)
- ❑ Intervention & Home Connection Supports
- ❑ Comprehensive Training, Materials and Supports

Other: _____