

Implementation of *Eureka Math* 2015-16

Introduction

Teachers are tasked with helping students meet the Nevada Academic Content Standards (NVACS). According to results from the *survey [Middle School Teachers' Perceptions of the Common Core State Standards for Mathematics and Related Assessment and Teacher Evaluation Systems](#)*, these standards are more rigorous, coherent, and focused than previous state standards. To accomplish the task of teaching to these standards, teachers are searching for curriculums, programs and resources to assist them.

Eureka Math, just three years old, is an open educational resource math curriculum developed by classroom teachers around the country. It was initially developed by the nonprofit Great Minds organization for New York State, appropriately named EngageNY, and has since been enhanced as *Eureka Math*. A review of the *Eureka Math* materials by independent EdReports gave the curriculum the highest scores among all new K-8 instructional materials for their alignment to the standards, focus, coherence and usability in the classroom.

Eureka Math is gaining momentum in the world of education, and many teachers in the NNRPDP region began to use the curriculum for the first time during the 2015-16 school year. As a response to requests for service, two regional coordinators supported these teachers by offering program specific professional development.

One intended outcome for this professional development was student demonstration of mathematical conceptual understanding of grade level standards. The second outcome addressed increased teacher mathematical knowledge and skills that enhance planning and implementation of *Eureka Math*. As a result of these outcomes, the following two questions were developed to focus the professional development:

1. What level of mathematics conceptual understanding do students demonstrate after learning from a teacher participating in *Eureka Math* professional development facilitated by the NNRPDP coordinators?
2. What specific understandings did teachers gain as a result of participating in *Eureka Math* professional development facilitated by the NNRPDP coordinators?

Structure of the Professional Learning

Professional development specific to the *Eureka Math* program was offered by two NNRPDP coordinators throughout the 2015-16 school year. Classes for continuing education, module studies, and individual coaching comprised the professional development offerings. These professional development opportunities were offered in the school districts where the majority of the participating teachers reside. Table 6 below gives detailed information about the professional development that was offered.

Table 1: PD for Eureka Math

Professional Development offered by the NNRPDP	Description	Number of Teacher Participants	Time
Focus on Fluency Eureka Class	<ul style="list-style-type: none"> • Analyze fluency activities • Learn and practice counting strategies • Deliberate practice with feedback from peers • Customize fluency activities 	60	Three different classes offered in August 2015 – Off contract time. Each class was 15 face to face hours, offered for one continuing education credit.
Preparation and Customization Class	<ul style="list-style-type: none"> • Discern the Plot Task • Find the Ladder (analyze the complexities of problem sets) • Hone the Lesson Task (determine the emphasis) • Professional Readings (Zuanyan Jiaocai) 	61	Three different classes offered in August 2015 – Off contract time. Each class was 15 face to face hours, offered for one continuing education credit.
Module Studies <ul style="list-style-type: none"> • Grade level specific 	<ul style="list-style-type: none"> • Examine the development of mathematical concepts, instructional strategies, and assessments within a particular module (unit) • Build strong content knowledge • Understand how the components contribute to successful implementation 	79	Twenty 3 hour module studies, beginning in October 2016, were offered throughout the year. These corresponded to the Eureka Math pacing sequence. The module studies were conducted after school released for the day, from 3:30 – 6:30 pm.
Individual Coaching	<ul style="list-style-type: none"> • Understanding of the structure of Eureka math • Planning and implementation of Eureka math 	11	Throughout the 2015-16 school year as requested, mostly on contract time.

Measurement

Class sets of student work samples were collected through an exit ticket from the *Eureka Math* curriculum from teachers in various parts of the NNRPDP’s region, providing between 54-58

samples per grade level. The class demographics represented a rich diversity of socio-economic, academic and cultural differences, with a range of academic abilities, including English language learners. The teachers were selected because of their participation in one or more of the professional development opportunities provided by the NNRPDP. An exit ticket from the *Eureka Math* curriculum, specifically one that would provide an opportunity for students to demonstrate mathematical conceptual understanding of grade level standards, was chosen by the regional coordinator from each grade, K-4. (See the Grade 4 sample exit ticket, Figure 25, and scoring rubric, Figure 26, below)

A STORY OF UNITS
Lesson 12 Problem Set
4•5

3. Compare the fractions given below by writing > or < on the lines.
Give a brief explanation for each answer referring to the benchmarks 0, $\frac{1}{2}$, and 1.

a. $\frac{1}{2}$ _____ $\frac{3}{4}$

b. $\frac{1}{2}$ _____ $\frac{7}{8}$

c. $\frac{2}{3}$ _____ $\frac{2}{5}$

d. $\frac{9}{10}$ _____ $\frac{3}{5}$

Figure 1: Sample Exit Ticket

A Progression Toward Mastery				
Assessment Task Item	STEP 1 Little evidence of reasoning without a correct answer.	STEP 2 Evidence of some reasoning without a correct answer.	STEP 3 Evidence of some reasoning with a correct answer or evidence of solid reasoning with an incorrect answer.	STEP 4 Evidence of solid reasoning with a correct answer.
	(1 Point)	(2 Points)	(3 Points)	(4 Points)

Figure 2: Rubric for Scoring Eureka Math

Teachers administered these exit tickets as they normally would. Using the *Eureka Math* 4-point rubric, a regional coordinator scored the class work, focusing specifically on the intent of the NVACS to which it aligns. Every grade level's student scores were combined as to depict a

more accurate measure of the students across the region that were able to demonstrate mathematical conceptual understanding of grade level standards. Table 7 below shows the average score for each grade level, which ranges between 3.2 and 3.7, which is evidence of high conceptual understanding overall.

Grade	N	Mean Score of Student Work
Kindergarten	58	3.7
Grade 1	58	3.7
Grade 2	55	3.2
Grade 3	54	3.2
Grade 4	55	3.7

Table 2: Student Scores

The outcome of increased teacher mathematical knowledge and skills that enhance planning and implementation of *Eureka Math* was measured by testimonials, a survey, and evaluations given at the conclusion of each professional development opportunity. The results of the scored student work could also be attributed to increased teacher knowledge.

Results and Discussion

The findings that measure student conceptual understandings of grade level standards can be found in Figure 27.

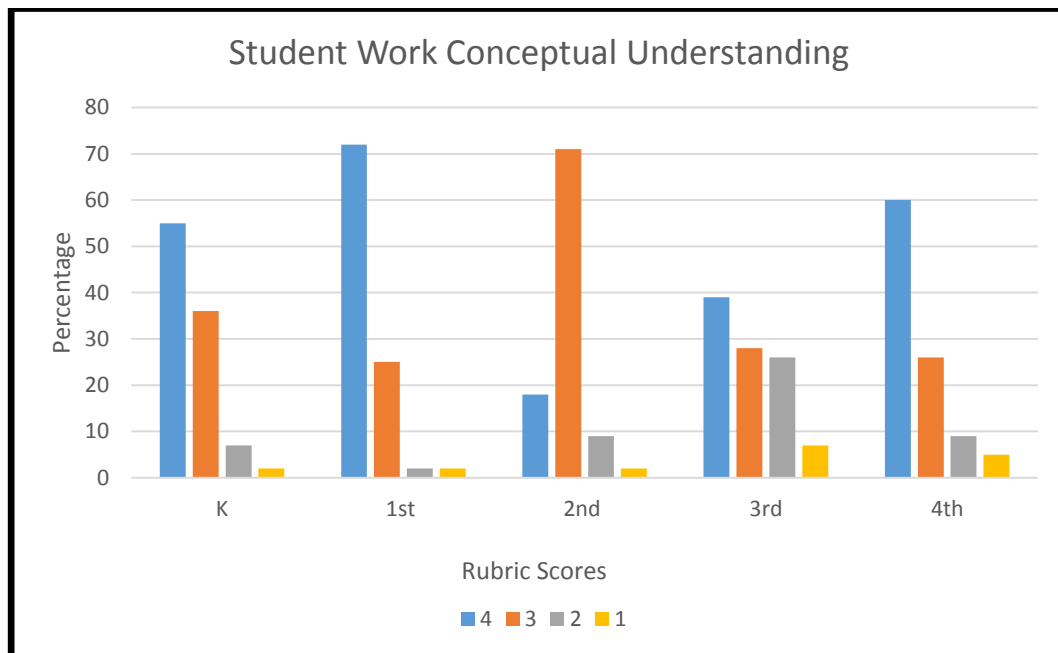


Figure 3: Student Work Conceptual Understanding

The majority of student work was scored a 4 out of 4 using the *Eureka Math* rubric. With the pattern of results in all grade levels being similar, it could be interpreted that the student work does indeed show that, using *Eureka Math*, students have a high level of conceptual understanding. *Eureka Math's* claim that "It's not enough for students to know the process for solving a problem; they need to understand why that process works so they can use it anytime" rings true when considering the student work that scored a 3 or a 4. Student work scoring less than a 4 could be further analyzed to determine the reason, as many of the students do show conceptual understanding, but not at 100% which prevents them from scoring a 4.

The table below indicates the specific understandings teachers feel they have gained as a result of *Eureka Math* professional development facilitated by the NNRPDP coordinators. All *Eureka Math* professional development opportunities involved teachers collaboratively examining the assessments, exit tickets, topics, lessons, and fluency activities, and discussing what to anticipate, e.g., preparations, student misconceptions, and possible modifications. This collaborative work led teachers to develop new understandings of the structure of *Eureka Math*, as well as the content, teaching strategies, and student outcomes. (See Table 8 below.)

Specific understandings teachers have gained
We have observed how tools and mathematical language progress throughout the grade levels, and build on one another.
Using the Read, Draw, and Write strategy has helped students read strategically, they have learned the difference between a meaningless drawing and a drawing with real mathematical significance, and have become proficient in writing an explanation of how and why they solved a specific task.
We have noticed that students catch on the concepts faster than previous programs we used.
After looking at the assessment, it was evident that they were very confused about what exactly it was we were figuring out (the mystery number) and exactly where that fit into the double tape diagram. I taught them to place a ? in the section(s) of the tape diagram and that seemed to help alleviate the trouble and they were more successful. I also think their troubles came from not using circles in the tape diagram to represent numbers. So along with the challenging concept of comparing using fewer or more, they had to move into using numbers and not circles in the tape diagrams. Lots of new information to process!!!!
Planning and implementation strategies that benefited my teaching the understanding of my students. It also helped to look ahead at the next module so that I was able to see the spiral of the curriculum. It helped me relax about student's mastery and understand that they will see the same skills multiple times.
Attending the Module Studies helped me understand: *The overall scope and sequence of each unit *The individual lessons within the unit *Tips, tricks, suggestions, and challenges within the lessons *A closer look at the mid and end of module assessments and how I could help prepare students to score well on them
The Module Studies were fabulous!!! It was great to talk with other teachers about what was being taught and how to look at things and figure out what they were wanting you to do. It helped me understand Sprints and Fluency Practice sheets better. It helped me see the reasoning behind the order of the Modules. I also saw that what I am teaching in Kindergarten will be used in all the grades up to 4th because I do the after school Homework Club.

I gained insight on how to customize Eureka Math more strategically into my classroom. I learned to make decisions on what was essential to keep in each lesson and practice and what I could delete or shorten. I learned how to better navigate the Great Minds site and how to use other resource to better implement this program.

The Fluency/Customization class helped me understand the importance of using the fluency activities and understanding how to customize my lesson to fit my students' needs. I really appreciated the reassurances that I did not have to read the lesson script word for word or try to lead my students to the lessons student responses. The Module Studies gave me a chance to prepare for the unit: what the main ideas were, where I may need to add/subtract/change a lesson and learn from other teachers. For me, learning about how other teachers would teach the unit was invaluable. For a new teacher getting to hear their ideas and struggles made it much easier and less stressful for me to teach Eureka math.

I gained a better understanding of how the Eureka Math Lesson is best presented and specific details about how to implement different parts of the lesson. The fluency and customization class really helped me think of how to best support and extend lessons. Also many, many ideas for fluency and how to continue to implement certain activities, like Sprints, or Happy counting more than once, but continue to increase the rigor. The Module Studies probably had the most impact on my planning and student learning because I was able to have more time to look at the assessment and collaborate with colleagues on which questions students would have difficulty with. We look at each topic overview in depth and saw how the concept and understanding progressed from day to day and how understanding from one lesson would be retaught and talked about the next day. I feel as a first year teacher in first grade, it helped me be more prepared with materials I needed, customizations I needed to prepare, and it gave me a deeper understanding of the lessons, so that I could read them once over the night before I taught them and summarize them, and not have to stand in front of my students with the book. I was able to collaborate on colleagues about timing and stay on the same lesson and pace, and we all were able to administer assessments within only one or two days apart from each other. The module studies also allowed us to see how each Module built on prior knowledge from previous Modules. During Module studies we were able to talk about how students did with similar questions in prior modules and topics and how we needed to support them.

Table 3: Teacher Understandings

These understandings reveal that teachers have gained specific understandings regarding *Eureka Math* that assists them to prepare and teach *Eureka Math* so that students can demonstrate conceptual understanding of grade level standards.

Conclusion

The early data, although inconclusive during this first year implementation of *Eureka Math*, show an upward trend in teachers' mathematical content knowledge, especially when planning math lessons that specifically target student conceptual understanding. The *Eureka Math* professional development opportunities provided by the NNRPDP could be a contributing factor. The resulting student work that demonstrates conceptual understanding may be the result of these dedicated teachers who have chosen to participate in the *Eureka Math* professional development experiences provided by the NNRPDP.

References

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