[EXT] Re: 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists

Donivan Porterfield <donivanporterfield@hotmail.com>

Mon 7/27/2020 10:18 AM

To:FeedBack, Rule, PED <Rule.FeedBack@state.nm.us>;

1 attachment

NM_PED_elementary_mathematics_specialists_proposed_rule_public_comment_porterfield_2020jul27.pdf;

Dear Mr. Sena,

My public comment on the proposed new rule (6.64.19 NMAC, Competencies for Elementary Mathematics Specialists) to allow educators with an elementary education license to add an endorsement specializing in elementary mathematics is attached.

Mr. Donivan Porterfield
PO Box 1417
Los Alamos, NM 87544
donivanporterfield@hotmail.com

July 27, 2020

Mr. John Sena, Policy Division
New Mexico Public Education Department
300 Don Gaspar Avenue, Room 121
Santa Fe, New Mexico 87501
rule.feedback@state.nm.us

Re: 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists

Dear Mr. Sena,

Thank you for the invitation to provide public comment on the proposed new rule (6.64.19 NMAC, Competencies for Elementary Mathematics Specialists) to allow educators with an elementary education license to add an endorsement specializing in elementary mathematics.

As a professional chemist for over three decades I am heartened at the recognition of the importance of elementary mathematics education as a necessary cornerstone in early education. However, I am concerned that only one of the identified accreditation paths in the proposed rule fully realizes the necessary preparation to be an elementary mathematics specialist.

I share the position of the National Council of Teachers of Mathematics (NCTM) that certification be advanced and that programs be developed to prepare EMS professionals:

> Districts, states or provinces, and institutions of higher education should work in collaboration to create (1) advanced certification for EMS professionals and (2) rigorous programs to prepare EMS professionals. EMS professionals need a deep and broad knowledge of mathematics content, expertise in using and helping others use effective instructional practices, and the ability to support efforts that help all pre-K-6 students learn important mathematics. Programs for EMS professionals should focus on mathematics content knowledge, pedagogical knowledge, and leadership knowledge and skills.

I believe the New Mexico Partnership for Math and Science Education will be separately providing more detailed suggested revisions to the proposed rule and I would suggest due consideration of their input by your office.

Mr. Donivan Porterfield
PO Box 1417
Los Alamos, NM 87544

[EXT] DRNM Comments 6.64.18 NMAC

Jesse Clifton <jclifton@drnm.org>

Mon 7/27/2020 1:01 PM

To:FeedBack, Rule, PED <Rule.FeedBack@state.nm.us>;

Cc:Don Priola <dpriola@drnm.org>; Marilyn Wolfe <mwolfe@drnm.org>;

1 attachment

Final_Comments 6 64 19_7 27 2020.pdf;

Please see the attached .pdf document with Disability Rights New Mexico's comments for proposed 6.64.18 NMAC. Please contact our office if you have any questions or concerns.

Best,

Jesse D. Clifton
Attorney and Corinne Wolfe Fellow for Transformative Advocacy
Disability Rights New Mexico
3916 Juan Tabo Blvd. NE
Albuquerque NM 87111
(505) 256-3100

July 27, 2020

Mr. John Sena
Policy Division
New Mexico Public Education Department
300 Don Gaspar Ave.
Room 121
Santa Fe, NM 87501

SUBMITTED VIA EMAIL AS PDF ATTACHMENT TO: *Rule.Feedback@state.nm.us*

RE: Proposed Rulemaking 6.64.19 NMAC Competencies for Elementary Mathematics Specialists

Dear Mr. Sena,

Disability Rights New Mexico ("DRNM") is the designated protection and advocacy agency in New Mexico whose purpose is to promote, protect, and expand the rights of individuals with disabilities. As part of that mission, DRNM advocates on behalf of students with disabilities across the state. In fulfilling that objective, DRNM is submitting the written comments below regarding the proposed introduction of new regulations on Competencies for Elementary Mathematics Specialists in the New Mexico Administrative Code ("NMAC"). DRNM appreciates the opportunity to share our thoughts on this important regulation with the New Mexico Public Education Department ("PED" or "the Department").

6.64.19.2 NMAC: Scope

The scope of this rule states that it is to be applied to "all institutions of higher education in New Mexico that establish or maintain a curriculum for persons seeking an endorsement as an elementary mathematics specialist to a state educator license." 6.64.19 NMAC. It is true that a good portion of this proposed regulation speaks to the academic and proficiency requirements of the elementary mathematics specialist position; however, DRNM believes that the scope of this regulation should also include local education authorities ("LEAs") since PED has incorporated what appears to be job description requirements for this position under 6.64.19.9 NMAC: Competencies for Elementary Mathematics Specialists and 6.64.19.10 NMAC: Pedagogical

Knowledge for Teaching Mathematics. Both of those sections are extensively detailed, which DRNM appreciates, but neither truly applies to the obligations of institutions of higher education in New Mexico. While DRNM generally approves of what these regulations require, we also assert that the scope of this regulation should extend to the hiring authorities for elementary mathematics specialists.

6.64.19.6 NMAC: Objective

DRNM would like to express our appreciation to PED for aligning New Mexico content standards and benchmarks for mathematics with the "national standards of the association of mathematics teacher educators [*sic*]." New Mexico's public school system has consistently been among the worst in the nation, and DRNM believes that aligning to national standards will help New Mexico public schools improve their delivery of mathematics instruction for all students, including those with disabilities.

That said, DRNM has concerns with the proposed regulations as currently written. For instance, PED needs to capitalize proper nouns such as the Association of Mathematics Teacher Educators ("AMTE"). PED should do this because capitalized proper nouns express intentional specificity to a particular association or entity. PED has done this when referencing the Praxis assessment for middle school mathematics content knowledge, but has failed to do so at other points in these regulations. Since these regulations pertain to the public education system, PED should hold itself to a higher standard in this regard.

6.64.19.8 NMAC: Requirements

This section of the proposed regulations provides the four different pathways for teachers to add an endorsement as an elementary mathematics specialist.

First Pathway to Endorsement

Teachers can add an endorsement as an elementary mathematics specialist by completing 30 semester hours in a PED approved "professional-preparation program" in addition to passing the "middle school mathematics content knowledge assessment offered by Praxis." 6.64.19.8 (B)(1) NMAC.

This pathway to endorsement requires intentional training in "professional preparation," and also requires a passing score in content knowledge. DRNM agrees both intentional training/professional preparation, as well as content knowledge mastery are essential. Given the high expectations of the Department for this position, PED should include a specialized training requirement for delivering effective mathematics instruction to students with disabilities.

Second Pathway to Endorsement

Teachers can add their endorsement by providing evidence of five years of relevant work and professional learning experience, which is established through submitting a resume and a minimum of two separate verification letters from the "district superintendent, director of a

charter school, curriculum and instruction director," or from "professional learning providers [*sic*] director or team leader." 6.64.19.8(B)(2) NMAC.

This pathway is unclear because "professional learning experience" is defined in 6.64.19.7(B) NMAC as "the demonstration of leading professional learning or working with professional learning providers to support mathematics understanding and implementing content and pedagogy." What is a "demonstration of leading professional learning"? Are the referenced "professional learning providers" approved or reviewed by the Department? Does tutoring students after school satisfy this requirement? PED is requiring five years of relevant work experience. That is a simple requirement. It remains unclear what, in addition to the five years of relevant work experience, is required for teachers to obtain their endorsement as an elementary mathematics specialist on this pathway. If the requirement for endorsement is simply five years of relevant work experience, PED needs to do better. The first pathway calls for intentional training as well as content competency. DRNM asserts that *any* pathway to endorsement must include those two components, at a minimum.

Third Pathway to Endorsement

Teachers can add their endorsement by taking and passing Praxis' "middle school mathematics content knowledge assessment," or by submitting a passing score on a "substantially similar subject knowledge middle grade mathematics assessment" from another jurisdiction; or by submitting a certificate from the "[*sic*] national board for professional teaching standards in mathematics, early adolescence, or mathematics, adolescence, and young adulthood." 6.64.19.8(B)(3) NMAC.

This entire subpart is confusing and unclear. At 6.64.19.8(B) NMAC, the regulations state that endorsement is attainted "through one of the following pathways." Subsequently, four subparts are broken down, each describing the requirements for that pathway to attain endorsement. However, 6.64.19.8(B)(3) is different. As written, this subpart seems to imply there are three different options to attain endorsement under 6.64.19.8(B)(3) NMAC. This does not follow the form of the surrounding regulations, however. For instance, (B)(1), (B)(2), and (B)(4) are each a self-contained pathways to endorsement. It does not make sense that (B)(3) would contain three additional pathways as opposed to being broken into separate subparts under 6.64.19.8(B). This confusion would easily be resolved if the subpart were written in regulation format and not in prose.

This subpart is insufficient for multiple reasons. First, PED needs to capitalize proper nouns and conform to the provisions of this subpart to the format of regulations and not in prose. This would also bring uniformity to PED's formatting of 6.64.19.8(B)(1), (2), and (4). DRNM strongly urges the following structure be used for 6.64.19.8(B)(3):[1]

(3) Take and pass the middle school mathematics content knowledge assessment offered by Praxis; <u>or</u>

<u>(a)</u> submit a passing score on a substantially similar subject knowledge middle grade mathematics assessment from another state, agency, or jurisdiction; or

[1] In addition to the formatting changes, the underlined portions are suggested additions to the text by DRNM.

(b) submit a valid, comparable certificate from the National Board for Professional Teaching Standards in the content area of mathematics for either:

(1) early adolescence; or

(2) adolescence and young adulthood.

Another reason this subpart is insufficient is because simply submitting a passing score for content knowledge assessment is not appropriate for an endorsement as an elementary mathematics specialist, especially considering the high expectations of that position as articulated by PED in 6.64.19.9 NMAC and 6.64.19.10 NMAC. If all that is required for endorsement is to submit a passing score for content knowledge assessment, why does the first pathway require this *in addition to* 30 semester hours of Department approved professional preparation? It might be the case that the national certification from the National Board for Professional Teaching Standards ("NBPTS") also requires professional preparation programming; however, nothing in the regulations state that the Praxis assessment and the "substantially similar" middle grade mathematics assessment incorporate any such component. DRNM believes PED should retain the NBPTS certification standard as a potential pathway for endorsement. The other two content knowledge assessment options should be required *in addition to* some Department approved professional preparation program as well as intentional, specialized training in teaching mathematics to students with disabilities. Otherwise, PED's high expectations from the position are unlikely to be met.

Fourth Pathway to Endorsement

Teachers can add their endorsement by completing 18 semester hours of mathematics education coursework. Among these hours, three semester hours must be in "mathematics pedagogical content knowledge including "learning and learning [*sic*], teaching, curriculum, and assessment." 6.64.19.8(B)(4) NMAC; *id* at (4)(c).

There appears to be yet another surface grammar error in this subpart. Unless Learning, Teaching, Curriculum, and Assessment is the name of a program or some other proper noun, PED needs to delete one "learning" from this subpart. DRNM appreciates the requirement for multicultural education, early mathematics development, and leadership. However, only one semester course (three semester hours) is required to discuss: (1) pedagogical content knowledge, (2) learning, (3) teaching, (4) curriculum, and (5) assessments. These are all necessary skills for the endorsed elementary mathematics specialist, and a single course will not adequately equip the elementary mathematics specialist to meet the high expectations of PED under 6.64.19.9 NMAC and 6.64.19.10 NMAC.

6.64.19.9 NMAC: Competencies for Elementary Mathematics Specialists

First, the subparts to this section do not conform to the formatting of the rest of the regulations. Unlike 6.64.19.8 NMAC and 6.64.19.10 NMAC, 6.64.19.9 NMAC is broken apart by numerical subparts (i.e. (1), (2), etc.) as opposed to alphabetical subparts (i.e. (A), (B), etc.). For consistency and reliability, PED should fix this error in addition to the many other surface level inconsistencies and grammatical errors it is proposing in these regulations. The number of these errors shows that the Department is unprepared to promulgate these regulations as a final rule; or

worse, a potential willingness to finalize such regulations without a more critical eye. It is our hope that PED will correct this simple formatting error before final publication of this rule.

PED has rightfully put an emphasis on the active role elementary mathematics specialists will need to take in their own professional development. *See* 6.64.19.9(1). However, DRNM is concerned that PED will not provide opportunities for meaningful professional development, but will simply require the endorsed specialist to provide their own "opportunities" for professional development as an instructional leader. The proposed regulations state that such opportunities could take the form of a subscription to an academic journal or participating in "discussion groups." *Id*. This does not provide the support the elementary mathematics specialists need for professional development as instructional leaders; PED needs to offer them Department approved professional development/training, or else require the LEA to provide structured professional development for the endorsed specialist. It is not enough to simply hope these endorsed specialists read professional periodicals.

The proposed regulations go on to require the elementary mathematics specialist to "communicate professionally with school and school district or charter school teams to assure high-quality mathematics instruction." 6.64.19.9(3) NMAC. There many areas that PED anticipates the elementary mathematics specialist will collaborate with their school, district, or charter teams in to assure "high-quality mathematics instruction," which DRNM supports. *Id*. However, DRNM asserts that students with disabilities who are in need of special education supports or services to access the general math curriculum require the endorsed specialist to be trained to work with students with disabilities. Without this intentional, specialized training, the endorsed specialist's interactions with schools and districts under 6.64.19.9(3) NMAC will fail to accomplish the following for many students with disabilities:

> (3)(a) "…addressing learning and achievement gaps;
> (3)(b) "…establish[ing] appropriate benchmarks for student learning goals…;
> (3)(e) "provision [*sic*] appropriate tools and resources targeted to specific individual student needs;"
> (3)(f) "…develop evidenced-based interventions for high- and low-achieving students; and"
> (3)(g) "secure additional resources as needed to maintain high expectations in mathematics classes for all students."

Consistent with the Least Restrictive Environment ("LRE"), students with disabilities are frequently in the regular education math classes (inclusion) in districts across the state. The elementary mathematics specialist must be trained to accomplish the aforementioned activities for students with disabilities, or else the current achievement gaps will persist, benchmarks and goals will continue to remain unmet or unsatisfactory, and the individual needs of "all students" will not be met. PED should require intentional, specialized training, or at least verified relevant work experience teaching students with disabilities mathematics.

6.64.19.10 NMAC: Pedagogical Knowledge for Teaching Mathematics

The need for specialized training or experience teaching students with disabilities mathematics is easily seen in this section of the proposed regulations. The proposed regulations acknowledge the importance of promoting the diversities that define "inclusion" in the classroom, but they do not call for specific training to achieve this for students with disabilities.

The high expectations of the previous section are met with the equally high expectations set forth by 6.64.19.10 NMAC. Both sections place an emphasis on the individual student and meeting the individual needs of all students. However, without specialized training in working with students with disabilities, these regulations will not convey the same benefit to those students. The instructional leader that these regulations describe will be ill-equipped to coach, mentor, or provide informed and meaningful input to special education mathematics teachers without specialized training and targeted, ongoing professional development. Special education mathematics teachers should not be put in the position to have to instruct the instructional leader on how their students learn differently.

This section of the proposed regulations states that "[t]o promote and advocate for equitable, high-quality mathematics instruction for all students" the endorsed specialist will collaborate with teachers and administration to support "the diversities of the classroom and school, including…disability." 6.64.19.10(A) NMAC. Such collaboration will allegedly:

> (1) "address issues of access and advancement" at all levels, including the individual student;
> (2) "establish clear goals within individual student learning progressions…and use the goals to guide instructional decisions;
> (3) "purposefully construct guidelines and support…including specific routines and instructional strategies that help cultivate positive mathematics identities for all students;
> (4) "design student learning opportunities that…(d) engage all students…to deepen understanding of mathematical concepts…(e) provide ample opportunity for all students to engage in academic discourse…as well as for individual expression in problem solving…(f)…assess and advance all students' reasoning and sense-making…(g) diagnose and leverage mathematical misconceptions and errors to design appropriate learning opportunities that support all students' mathematical conceptual development…(j) assess all student abilities, through formative and summative assessments, and develop actionable strategies to help all students fill in learning gaps."
> (5) Reflect and "…adjust instructional approaches characterized by:" (a) using evidence to continually adjust instruction that supports "learning for all students," including enrichment and differentiated instruction; (b) using strategies "deliberately designed to support specific groups of student learners; and (c) organized support of delivery of developmentally appropriate instruction that is responsive to individual learners."

In addition to collaboration, these regulations state that the endorsed specialist will "promote pedagogical shifts and professional growth for self and teachers" by:

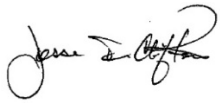
(B)(3) "support[ing] the use of various instructional applications of technology that are evidence-based and are developmentally-, mathematically-, and pedagogically-grounded;
(B)(5) "support[ing] teachers in their analysis and evaluation of student ideas and work, and design appropriate responses to support and further student mathematical learning, aligned to individual goals;
(B)(7) "support[ing] teachers in the use of the formative assessment cycle, which includes administering a formative assessment task, and analyzing student responses to the task, and designing and re-teaching lessons based on this analysis; and be able to find or create appropriate resources for this purpose."

As excellent as these expectations are, it is simply unrealistic to think that the endorsed elementary mathematics specialist can meet these expectations for "all students" without specialized training and targeted, ongoing professional development. Students with disabilities face more obstacles than the subject matter alone. Attention deficit, distractibility, work avoidance behaviors, cognitive impairments, sensory-related conditions, visual and hearing impairments, and so many other disability-related obstacles are issues can impair learning. The endorsed specialist cannot hope to effectively interface with and meaningfully assist students with disabilities without this training and professional development.

Conclusion

DRNM appreciates the opportunity to participate in the comment period for this proposed regulation. We would also like to extend our appreciation to PED for providing these regulations, which will hopefully improve the general instruction, interventions, and teaching methods of mathematics in New Mexico's elementary schools. DRNM is grateful for the specificity PED used when drafting and promulgating these regulations.

Sincerely,



Jesse D. Clifton

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[EXT] MSAC comments on rule 6.64.19

Tanya Rivers <riverst@wnmu.edu>

Mon 7/27/2020 4:05 PM

To:FeedBack, Rule, PED <Rule.FeedBack@state.nm.us>;

Cc:wtamez@nmsu.edu <wtamez@nmsu.edu>; srobbins@lanl.gov <srobbins@lanl.gov>; bcotton@lcps.net <bcotton@lcps.net>; asuggs7@hotmail.com <asuggs7@hotmail.com>; Tanya Rivers <riverst@wnmu.edu>; mollie@santafebotanicalgarden.org <mollie@santafebotanicalgarden.org>; GLENDA, LEONARD <gleonard@risd.k12.nm.us>; Dooling, Dave, DCA <Dave.Dooling@state.nm.us>; lfaith-heuertz@nmmesa.org <lfaith-heuertz@nmmesa.org>; m barton <mbartonsf@gmail.com>; Vazquez, Yanira, PED <Yanira.Vazquez@state.nm.us>; Warniment, Gwen, PED <Gwen.Warniment@state.nm.us>;

1 attachment

MSAC Letter to PED Rule 6.64.19.pdf;

Attached please find comments from the Math and Science Advisory Council concerning proposed rule 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists.

Thank you for your time and consideration.

--Tanya Rivers, MSAC Co-Chair

Tanya Rivers
my pronouns: she/her/hers (why this?)
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Family Math Learning

FREEPORT-MCMORAN FOUNDATION

WNMU

New Mexico Math and Science Advisory Council

July 27, 2020

John Sena
Policy Division, New Mexico Public Education Department
300 Don Gaspar Avenue, Room 121
Santa Fe, New Mexico 87501

Dear Mr. Sena;

On behalf of the Math and Science Advisory Council (MSAC), we appreciate the work of the Math and Science Bureau to move forward with developing the Elementary Mathematics Specialist endorsement. MSAC is composed of twelve members from throughout the state that represent the state's demographics and various stakeholders in our education system. The purpose of the council is to advise the Math and Science Bureau by making recommendations regarding the statewide strategic plan for improving mathematics and science education and advise the PED and the legislature regarding appropriations for math and science education, resources and services, including programs for students and educators.

The proposed ruling 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists supports one of the Action Recommendations in the 2019 MSAC Annual Report to *Establish elementary math specialist and elementary science specialist certificates focused on the learning needs of elementary children.*

Rule 6.64.19 is a positive step that outlines important leadership and pedagogical skills needed for an effective Elementary Mathematics Specialist. While these sections of the rule provide a strong foundation for an EMS, the committee members have heard concerns of the mathematics education community regarding strengthening the pathways listed in 6.64.19 that lead to an EMS certification. The committee encourages the Math and Science Bureau to continue to work with the mathematics education professionals and experts who strive to improve student access to quality math education to develop pathways that hold high expectations for specialized knowledge required of elementary mathematics specialists. The committee also recommends that all pathways for certification are consistent with the joint position statements from the Association of Mathematics Teacher Educators (AMTE), the Association of State Supervisors of Mathematics (ASSM), the National Council of Supervisors of Mathematics (NCSM), and the National Council of Teachers of Mathematics (NCTM).

Sincerely,

Wanda Bulger-Tamez
Director of NMSU-STEM Outreach
wtamez@nmsu.edu

Tanya Rivers
Mathematics Faculty, WNMU
riverst@wnmu.edu

[EXT] Feedback on proposed new rule 6.64.19 NMAC

Leonard, Zachary A <zleonard@lanl.gov>

Mon 7/27/2020 1:35 PM

To:FeedBack, Rule, PED <Rule.FeedBack@state.nm.us>;

Cc:Selena Connealy <connealy@epscor.unm.edu>; Danielle Kusmak <dkusmak@tularosa.net>; Warniment, Gwen, PED <Gwen.Warniment@state.nm.us>; Vazquez, Yanira, PED <Yanira.Vazquez@state.nm.us>; Stewart, Ryan, PED <Ryan.Stewart@state.nm.us>;

1 attachment

NMPMSE Letter RE_ 6.64.19 NMAC.pdf;

Dear Mr. Sena,

Please find feedback from the **New Mexico Partnership for Math and Science Education** regarding proposed new rule 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists.

Best regards,

Zach Leonard
Co-chair, NMPMSE

Ζαχηαρψ Α. Λεοναρδ, Εδ.Δ.
Λοσ Αλαμοσ Νατιοναλ Λαβορατορψ
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Community Partnerships Office
1619 Central Avenue
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505-699-4053

John Sena
Policy Division
Public Education Department
300 Don Gaspar
Santa Fe, New Mexico 87501

Dear Mr. Sena,

The New Mexico Partnership for Math and Science Education is a statewide membership organization representing institutions and programs involved in STEM education across New Mexico. The members of the Partnership agree that establishing an EMS endorsement in New Mexico is an essential step in building capacity for mathematics teaching and learning at the elementary level. An EMS endorsement will provide opportunities for teachers, teacher leaders, and mathematics coaches who seek to deepen their content knowledge, pedagogical content knowledge, knowledge of effective teaching practices, and leadership skills. This will in turn help proliferate the use of best practices and strengthen teaching and learning in schools and districts across New Mexico.

The NMPMSE acknowledges how important it is to get this rule right from the beginning as it has the potential to be an important strategy for improving mathematics education in New Mexico. However, what is put forth in this rule change will not ensure a high standard of expertise and knowledge for elementary mathematics specialists. It is also inconsistent with the joint position statements from the Association of Mathematics Teacher Educators (AMTE), the Association of State Supervisors of Mathematics (ASSM), the National Council of Supervisors of Mathematics (NCSM), and the National Council of Teachers of Mathematics (NCTM).

The NMPMSE strongly opposes the omission of mathematics content competencies and pathways B.2 and B.3 as written in the proposed new rule 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists. These pathways undermine the intent of establishing the endorsement. We recommend changing the language in pathways B.1 and B.4 to ensure an EMS endorsement is aligned with the knowledge and skills represented by the high standards of the competencies.

Our recommendations:

- **6.64.19.6 - Suggested language for the objective of the EMS:** The objective of this rule is to build specialized knowledge for mathematics teaching and learning and leadership in experienced teachers. The EMS endorsement will serve NM educators, including teachers, teacher leaders, and mathematics coaches, who seek to deepen their content knowledge, pedagogical content knowledge, knowledge of effective teaching practices, and leadership skills to establish themselves as advocates and leaders in their classrooms, districts and beyond.
- **6.64.** - Add back in Section 3, *Knowledge of Elementary Mathematics* from the original document titled *Elementary Mathematics Specialist Certification Compentiences*, as originally submitted to the PED by the NM Math Education Collaborative in September 2019.

- Rationale: Knowledge of Elementary Mathematics–and not middle school mathematics–is the essence of this endorsement. Therefore, the competencies related to knowledge of elementary math content should not be omitted.

- **6.64.19.8.A.** - Remain unchanged
- **6.64.19.8.B.1.** - Modify language
  - Suggested language: Complete a master's degree, of which 18 hours meet the requirements of the EMS outlined in pathway B.4. below.
    - The middle school mathematics content knowledge assessment offered by Praxis is not aligned to the EMS competencies outlined in Section 3, *Knowledge of Elementary Mathematics* as part of *Elementary Mathematics Specialist Certification Compentiences.* Therefore, a middle school mathematics assessment should not be a requirement for obtaining an EMS.
- **6.64.19.8.B.2.** - Replace with a Dossier/Portfolio process (see Appendix A below)
  - Rationale: A resume and two verification letters are not sufficient evidence of the knowledge and skills outlined in the competencies. However, a portfolio process would honor and provide evidence of the knowledge and skills of experienced teachers while also providing a fair but rigorous process for demonstrating they have the knowledge and skills outlined in *Elementary Mathematics Specialist Certification Compentiences.*
- **6.64.19.8.B.3** - Remove completely
  - Rationale: None of the suggestions in this pathway are aligned to the *Elementary Mathematics Specialist Certification Compentiences* nor will they ensure that teachers have specialized knowledge of elementary mathematics content, pedagogy, and leadership.
- **6.64.19.8.B.4.** - Replace language as outlined below. (Yellow highlights indicate proposed changes)

(4) Complete 18 semester hours of mathematics graduate education coursework as part of an approved EMS program that aligns with the competencies described in this regulation

(a) three semester hours of multicultural mathematics education, which shall include substantive methods for supporting all learners in accessing relevant mathematics instruction;

(b) six semester hours of early mathematics development, including Pre-number concepts, Early Number Sense, Base-Ten Place Value System, Operations on whole numbers to build understanding of operations on fractions, mixed numbers, and decimals, and Early Algebra, Geometry and Measurement, and Data Analysis.

(c) three semester hours in mathematics pedagogical content knowledge, which shall include ~~learning and~~ learning, teaching, curriculum, and assessment;

(d) three semester hours of mathematics leadership, which shall cover topics of leadership knowledge and skills relevant to advancing the teaching and learning of mathematics at the systems level; and

(e) three semester hours of practicum, which shall include mathematics leadership challenges and issues that mathematics leaders encounter. The practicum experience shall include 35 hours of field experience engaging in professional learning designed to improve mathematics teaching and learning (e.g., co-leading professional learning designs, analyzing student work, peer observation and feedback cycles).

We acknowledge that there are likely to be candidates for EMS endorsement that have acquired necessary knowledge, skills, and abilities for such endorsement without having completed one of the pathways identified above. For such candidates, we strongly urge the department to include a portfolio pathway modeled after the state's tiered licensure program and/or the National Board Certification program. Requirements for such a pathway are outlined in Appendix A, below, and suggested language changes in section **6.64.19.8.B.2**, above.

The intent of proposing new rule 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists, is to improve teaching and learning of mathematics in elementary schools across the state by developing specialized knowledge and skills in individual teachers, teacher leaders, and mathematics coaches who will act as change agents within their system. Please consider the suggested changes as a way to realize this vision and be consistent with best practices.

Best regards,

Dr. Zachary Leonard, Co-chair, NMPMSE, Los Alamos National Laboratory
zleonard@lanl.gov
505-699-4053
Danielle Kusmak, Co-chair NMPMSE, Owner, Tularosa Pistachio Groves
Dr. Selena Connealy, Treasurer NMPMSE, NM EPSCoR
Dr. Hy Tran, Secretary, NMPMSE, Sandia National Laboratories

CC:
Secretary Ryan Stewart
Deputy Secretary Gwen Warniment
Director, Yanira Vasquez

Appendix A

Portfolio demonstrating the candidate is a reflective practitioner and has competency in

- Instructional Leadership
- Advanced Pedagogical Knowledge and Practices for Teaching Mathematics to Culturally and Linguistically Diverse Children
- Comprehensive Knowledge of Elementary Mathematics

An EMS Portfolio would be composed of transcripts, degrees, certificates, compilations of data, videos of relevant work, analysis and other components, as appropriate. By completing a portfolio, potential EMS holders would demonstrate their commitment to on-going professional development and learning.

A statement committee should be tasked with evaluating the portfolio to ensure it provides sufficient evidence of knowledge and skills of the *Mathematics Specialist Certification Compentiences.*

Components of Portfolio: (The following could be components of the EMS portfolio)

Demonstrate Instructional Leadership

- Action research/writing component
- Video record and reflective analysis of one or more instructional leadership activities
- Data (e.g., video, written documentation, interview data) regarding outcomes of instructional leadership activities
- Resources (e.g., texts, protocols, bibliography, etc.) used to support your instructional leadership activities
- Transcripts, certificates, or degrees relevant to instructional leadership, as appropriate

Demonstrate Advanced Pedagogical Knowledge and Practices for Teaching Mathematics to Culturally and Linguistically Diverse Children

- Action research/writing component
- Video record and reflective analysis of two or more mathematics teaching practices
- Data (e.g., video, written documentation, interview data) of advanced pedagogical practices for teaching mathematics
- Resources (e.g., texts, protocols, bibliography) used to support your use of advanced pedagogical knowledge and teaching practices
- Transcripts, certificates, or degrees relevant to knowledge of practices for teaching mathematics, as appropriate

Demonstrate Comprehensive Knowledge of Elementary Mathematics

- Action research/writing component identifying connections and progressions for one strand of elementary mathematics across grade levels

- Video record and reflective analysis demonstrating knowledge of elementary mathematics (e.g., analysis of student work, providing professional development for elementary mathematics teachers, discussing content deeply with students)
- Resources (e.g., texts, protocols, bibliography, etc.) used to support your knowledge of elementary mathematics
- Transcripts, certificates, or degrees relevant to knowledge of elementary mathematics, as appropriate

[EXT] Feedback on proposed new rule 6.64.19 NMAC

Ted Stanford <thstanfo@nmsu.edu>

Mon 7/27/2020 4:06 PM

To:FeedBack, Rule, PED <Rule.FeedBack@state.nm.us>;

Cc:Vazquez, Yanira, PED <Yanira.Vazquez@state.nm.us>; Hooten, Jenifer, PED <Jenifer.Hooten@state.nm.us>; Chaudhary, Shafiq, PED <Shafiq.Chaudhary@state.nm.us>;

1 attachment

TS_memo_to_PED_about_proposal_66419.docx;

To : Public Education Department, New Mexico
From : Ted Stanford, Associate Professor of Mathematics, NMSU, Las Cruces
Date : 27 July 2020
Subject : response to proposed rule 6.64.19

This morning I attended the Rule Hearing which was conducted via Zoom, and I briefly expressed my concern about proposed rule 6.64.19, *Competencies for Elementary Mathematics Specialists.* The purpose of this memo is to state my concern in writing, and to give specific examples that support my position.

I have been involved in discussions with colleagues across the state, and I will be signing on to other letters which address several problems with 6.64.19. Here I wish to express some very specific ideas about the mathematics, based on my own expertise and experience. This memo should not be taken as an official position of the Department of Mathematical Sciences at NMSU.

My background is in mathematics. I received a PhD in Mathematics in 1993, and I have taught mathematics courses at all levels at various universities. Since 2000, I have been at NMSU. Since 2004, I have worked extensively with Mathematically Connected Communities, Math Snacks, and other K-12 mathematics initiatives. I was a member of MSAC for five years. I have taught mathematics courses to hundreds of pre-service elementary teachers, and worked with hundreds of in-service elementary teachers, both in their classrooms and in PD sessions.

The main point that I wish to make is that there is a body of advanced mathematical knowledge on Elementary Education, and that more of this knowledge is desperately needed in our schools. The proposed rule, as currently written, will not do much to promote this knowledge. I am concerned that an opportunity to make real progress is being wasted.

This specialized knowledge goes beyond what we can expect from a university graduate, and it goes beyond what we can expect from a general elementary teacher. This specialized knowledge is not secondary school mathematics. This specialized knowledge is not tested by Praxis or similar tests, and is not the same as the knowledge associated with National Board Certification for adolescents. I will illustrate this with some examples.

1. **<u>Number lines.</u>** There are three distinct representations that go under the name "number line" in elementary school.
    - Number paths, a kind of counting aid with whole numbers.
    - Number lines with an equal-interval scale.
    - Open number lines.

    Each of these has its place. Each has affordances and limitations. The problem I have seen, regularly, is that the three ideas get mixed up with each other. Recently I have seen teachers get excited about open number lines as

a strategy for representing a student's thinking in whole number arithmetic, with no accompanying discussion of the problems this can cause when students have to represent fractions on a number line. For students, this either reinforces the message that mathematics is a jumbled heap of knowledge fragments that don't fit together, or else it leaves them hopelessly lost as they try to reconcile different ideas of what the spaces or jumps mean on a number line.

2. **Understanding length and area**. Many teachers know that kids have difficulty with "area" and "perimeter". The issue is deeper, however, and points to underlying difficulties with linear measurement, and its relationship with area. Research shows that a robust conceptual understanding of length and area takes years to develop. Many students, even at the university, think that "area" means "length times width", or sometimes they think that "area" means "count the boxes." Each of these conceptions, while not wrong per se, is only a partial understanding, and does not get at the properties of area as a concept and measurable quantity in its own right. Decomposition, and the additivity of area, come much closer. Both are specifically mentioned in the current elementary school standards, but my experience has been that most teachers don't know why that language is there, why it is important, or how to use it effectively with third graders.

3. **Place value and unitizing.** Try to think for a moment about being a young child, and having someone talk about "three tens". This is a weird phrase. "Three" and "ten" are both numbers. How can you count numbers with numbers? As adults, we have gotten so used to this idea that we don't realize that many kids are stumped by phrases like this. Their knowledge of cardinality, ordinality, and conservation of number is still new and fragile. Maybe they are just beginning to have the lightbulbs go on about combining numbers, so if you say "three" and "ten" in the same sentence, they can imagine how three things and ten things might be combined to form thirteen things. But "three tens" means something else – the "three" and the "ten" refer to different conceptions of counting, and different units.

   I still have a lot to learn about this particular issue, and I have colleagues who know much more about it than I do. But it is increasingly clear to me that many children in math classes are not understanding concepts that adults take for granted, and that this disconnect is often hidden by an apparent ability with procedural understanding: a child is able to follow instructions, and get the right answer, so they are assumed to understand what is going on. When the child starts having obvious difficulties, it frequently turns out that the root of the problem is a key conceptual point that they missed several years ago.

4. **<u>Properties of operations.</u>** Current standards call for extensive use of the commutative, associative, distributive, etc, properties in elementary school. These properties can be useful and accessible to children, and they can, and should, help children make sense of real-world mathematics. Very often, however, they are taught as a separate topic - an extra thing to learn. There is an overemphasis on exotic words like "commutative", and very little discussion of why these properties are useful, which properties are helpful in which situations, and what other properties there might be which children can discover and investigate themselves.

5. **<u>Conceptual understanding, and developmental issues.</u>** A common thread through all of the above is the crucial distinction between Procedural and Conceptual understanding. Children can be "shown how" to do things. Most children want to please their teachers, and most children have some facility in mimicking simple behavior. Children *appear to be getting* an important concept, when in fact, sometimes, they are just mimicking. A complicating factor is that while procedural understanding can sometimes be built on a schedule (as in grade level standards, or a scope and sequence document), conceptual understanding is much more individual, and variable. Let me illustrate with a specific classroom task:

   Children around first or second grade are sometimes asked to measure a pencil with paperclips. Lay the pencil on a desk, line up some paperclips next to it, count the paperclips. Success! – they appear have learned about measurement. And using "nonstandard units" makes it sound conceptually more deep. You can use anything as a unit!

   But this apparent success masks some conceptual problems. Some children mix paperclips of different sizes. Some children leave gaps between the paperclips, or let the paperclips overlap. You can make rules, of course, about the sizes of paperclip, and about gaps and overlaps. But then what if someone turns the paperclips sideways – do you have to make a rule about that too? The point here is that when the lightbulb goes on about linear measurement, there is no need to make such rules – students will see clearly the *purpose* of measuring, and why gaps, overlaps, and different-sized units will defeat that purpose.

   The "specialized knowledge" that I and others are promoting is not simply knowing that "kids will leave gaps and overlaps", or that "at some point, the lightbulb will go on". The issue, rather, is how to engineer learning experiences in the classroom so that kids are making productive progress, even when the lightbulb hasn't gone on yet, and even when the lightbulb is on for some kids but not others. For this, a deeper set of understandings and experiences about length is required. Linear measurement is an abstract idea, and it is also a phenomenon that occurs in many places in the real world, and it is also a major developmental task for children in our modern

world – all three of these aspects are part of the specialized knowledge that we are advocating.

Other examples. I chose the above examples because they are right in the thick of elementary school mathematics, and because they also have subtle conceptual points and problems which are often missed in the busy day-to-day schedule of school. There is a lot to study here. Knowing more secondary or university mathematics won't help much with these issues. I could have chosen other topics: the connection of liquid volume in 3rd grade with cubic unit volume in fifth grade, connections between measurement and approximation, the relationship between decimals and whole number place value, the progression from additive thinking to multiplicative thinking, and others.

Research. The pencil and paperclip example above comes from Constance Kamii, a mathematics educator who has done extensive research on how children come to understand "logico-mathematical knowledge" (ie, the lightbulb). This memo is not the place to dig into specific research articles, but all of the issues I have discussed above are addressed by research in recent decades. Understanding something about this research is another part of the advanced, specialized, elementary knowledge that I and my colleagues are advocating for. There are several aspects of this.

- Awareness of the research, and awareness that there is an ongoing development of new knowledge about how children learn both concrete and abstract mathematics
- Ability to read, process, and utilize new mathematics education research in some form
- A research mindset in your own classroom – how to systematically and effectively learn from your own students, and how to share that knowledge with your colleagues. (This does not mean that we expect all Mathematics Specialists to be researchers. It's more about paying attention to student thinking, and about learning and growing in your own mathematical knowledge as a teacher and as a teacher leader.)

Standards. All of the examples above are addressed in the current standards (Common Core). There is not time to give details here, but one of the main things that we would like an Elementary Mathematics Specialist to be able to do is read and make sense of the elementary standards. This includes understanding the reasons for specific language - terms like *additive, strategy, decomposition, number line, property,* which have specific meanings and importance in the standards framework. It also includes understanding the horizontal connections between mathematical topics, and the vertical connections from one grade level to another.

Thank you for your efforts to move forward with the important issue of Elementary Mathematics Specialists in New Mexico, and thank you for the opportunity to comment.

[EXT] Public comment for 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists

Kersti Tyson <kersti@lanlfoundation.org>

Mon 7/27/2020 4:28 PM

To:FeedBack, Rule, PED <Rule.FeedBack@state.nm.us>;

Cc:Jenny Parks <Jenny@lanlfoundation.org>;

1 attachment

Scan.pdf;

Greetings:

Attached please find public comment for

6.64.19 NMAC, Competencies for Elementary Mathematics Specialists

This email is being submitted on behalf of Jenny Parks, President & CEO of the LANL Foundation.

With regard,
Kersti Tyson
Director of Evaluation and Learning
LANL Foundation

LANL FOUNDATION
Investing in Learning & Human Potential

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Dr. Ryan Stewart
Secretary of Education
State of New Mexico
Public Education Department
300 Don Gaspar
Santa Fe, New Mexico 87501

Dear Secretary Stewart,

The LANL Foundation supports establishing an Elementary Mathematics Specialist (EMS) endorsement in New Mexico. We see this endorsement as an essential step to ensure New Mexico's students have access to mathematics instruction from teachers who have a deep understanding of mathematics content and pedagogy. A strong EMS endorsement will provide opportunities for teachers, teacher leaders, and mathematics coaches, to develop and demonstrate their advanced content knowledge, pedagogical content knowledge, knowledge of effective teaching practices, and leadership skills. By supporting experienced teachers to develop advanced practices and knowledge for teaching mathematics the EMS endorsement will provide a pathway for teachers to be recognized for their initiative, advanced pedagogical practices and leadership. The EMS endorsement will help to identify who is qualified to support other teachers to develop best practices in teaching and designing learning opportunities that will support New Mexico's elementary students to develop conceptual understanding of mathematics through sense-making, productive struggle, discussion and joy.

We are concerned about the first three requirements identified in **6.64.19.8.B,** the pathways that have been identified to obtain an Elementary Mathematics Endorsement in New Mexico. The only requirement identified that aligns with the proposed competencies in 6.64.19.9 and pedagogical content knowledge in 6.64.19.10 is pathway four **(6.64.19.8.B (4))** which defines a pathway for teachers to develop pedagogy and leadership skills and knowledge through an approved 18 credit hour program. Pathways one through three do not align with the proposed competencies as they only verify a candidates' minimal content knowledge and/or teaching experience. With the exception of a holding National Board Certification in mathematics, identified in **(6.64.19.8.B(3))**, the requirements described do not align with best practices and do not align with the intent of an EMS endorsement. Elementary Math Specialists need *advanced* content knowledge, pedagogical content knowledge and skills, and leadership skills. The requirements described in the proposed **6.64.19.8.B (1-3)** minimally ascertain a teacher's content knowledge (with the exception of the National Boards Certification). They do not establish requirements that help ascertain a teacher's advanced pedagogical content knowledge, and leadership skills. If the requirements described in **6.64.19.8.B (1), (2) and (3)** are adopted without significant revision, they have the potential to undermine the intent, meaning and potential outcomes of establishing the endorsement for Elementary Mathematics Specialists in New Mexico.

We encourage the New Mexico Public Education Department to adopt requirements that will align with reccomendations described in the joint position of the Association of Mathematics Teacher Educators (AMTE), the Association of State Supervisors of Mathematics (ASSM), the National Council of Supervisors of Mathematics (NCSM), and the National Council of Teachers of Mathematics (NCTM):

> The AMTE, ASSM, NCSM, and NCTM recommend the use of Elementary Mathematics Specialists (EMS) in PK–6 environments to enhance the teaching, learning, and assessing of mathematics in order to improve student achievement. We further advocate that every elementary school have access to an EMS. Districts, states/provinces, and higher education should work in collaboration to create: (1) advanced certification for EMS professionals; and (2) rigorous programs to prepare EMS professionals. EMS professionals need a deep and broad knowledge of mathematics content, expertise in using and helping others use effective instructional practices, and the ability to support efforts that help all PK–6 students learn important mathematics. Programs for EMS professionals should include foci on mathematics content knowledge, pedagogical knowledge, and leadership knowledge and skills.
> (https://www.mathedleadership.org/docs/ccss/JointStatementOnMathSpecialists.pdf)

In order to align with best practices, New Mexico's EMS endorsement needs to be an *advanced* certification for teacher leaders and the requirements need to support the development and assessment of teachers' advanced mathematics content knowledge, pedagogical knowledge and practices, and leadership knowledge and skills.

With regard,

Jenny Parks

Jenny Parks
President and CEO

[EXT] Comment on proposed rule 6.64.19 NMAC Competencies for Elementary Mathematics Specialists

Erika Acosta <ejacosta@nmsu.edu>

Mon 7/27/2020 4:36 PM

To:FeedBack, Rule, PED <Rule.FeedBack@state.nm.us>;

1 attachment

letter to PED for EMS competencies rule.docx;

Please see my attached letter and accept it as public comment for the proposed rule, thank you.

Erika Acosta

To: Policy Division in NM Public Education Department
From: Erika Acosta, Elementary Mathematics & Science Specialist Program Coordinator, NMSU, Las Cruces.
Date: July 27, 2020
Regarding Proposed Rule 6.64.19 NMAC Competencies for Elementary Mathematics Specialist

Dear Colleagues:

My name is Erika Acosta, and I work for Mathematically Connected Communities (MC2) at New Mexico State University. My position there is Education Program Specialist and Program Coordinator for the Elementary Mathematics and Science Specialist (EMSS) Program. I want to express my excitement about moving forward with the approval of the Competencies for Elementary Mathematics Specialist, this is a positive move towards transforming elementary mathematics in our state.

As stated in the Rule Hearing this morning, I taught elementary mathematics and science in a departmentalized setting for eleven years at Gadsden ISD, and I can speak of the tremendous growth I have coming out of the classroom and collaborating in the EMSS program. As a teacher, I was part of the Learning Institute for Teachers (LIFT) cohort between May 2012 and July 2014, and completed the masters coursework. I was also the math department chair at the two elementary schools I taught in between 2010 and 2018, and I was a teacher leader with Mathematically Connected Communities (MC2) from 2014 until I became part of the MC2 staff in 2019. When I left the classroom, I was rated as an exemplary teacher by the NM PED Educator Evaluation. **I highlight this because although I was highly effective in the classroom and was viewed as a leader and mentor in mathematics instruction, I was not qualified to be an Elementary Mathematics Specialist.**

I believe pathway 2 does not sufficiently demonstrate that a candidate meets the EMS competencies, as experience in teaching elementary math and verification letters stating the candidate has professional learning experience in the area of mathematics alone do not mean that said candidate has the deep content knowledge that an EMS should have in k-6 elementary mathematics. The AMTE standards for Elementary Mathematics Specialists (2013) which were written as an effort to outline the "knowledge, skills, leadership qualities necessary for the roles and responsibilities an EMS professional may assume" expand on an EMS's ability to utilize and build upon learner's knowledge, skills, understanding, conceptions, and misconceptions to advance learning, and ask an EMS to draw upon content knowledge that exceeds the required knowledge of a generalist K-8 teacher.

I would like to highlight that the coursework, Professional Learning, and conversations I have engaged in with the instructors and EMSS program participants have transformed my understanding of elementary mathematics. I strongly suggest that Pathways 1 and 4 include graduate level preparation programs. In New Mexico, we have a structure in place to intensify teacher professional development, which is the PED's Education Evaluation, it establishes a framework for continuous improvement and professional growth for teachers, and domains are used to observe and provide feedback that measure classroom practices and teachers' participation in a professional learning community. In NM we understand and are committed to focused and intense PD that encourages teachers to envision reform, which is more likely to improve classroom culture. I want to highlight the pivotal opportunity we have to use the Competencies

for EMS as a way to create graduate level programs that develop EMS's abilities to utilize and build upon learner's knowledge, skills, understandings, conceptions, and misconceptions to advance learning for both teachers and students.

Thank you for your time and for considering these suggestions, thank you especially for your dedication to NM education.

Sincerely,
Erika J. Acosta

The Association of Mathematics Teacher Educators' (AMTE) Standards for Elementary Mathematics Specialists (2013) were written as an effort to outline the" knowledge, skills, and leadership qualities necessary for the roles and responsibilities an EMS professional may assume" (p.6), as a way to address the need to help all students learn important mathematics, and as a result of the lack of knowledge to teach mathematics with, "coherence, precision, and reasoning". The Standards list the mathematical content and pedagogical knowledge for teaching mathematics, the latter including standards about an EMS's ability to utilize and build upon learner's knowledge, skills, understandings, conceptions, and misconceptions to advance learning.

Pedagogical knowledge of teachers affects their ability to understand trajectories, understand cultural differences among learners, design and adapt tasks and sequences, understand how technical language supports student learning, construct and evaluate multiple representations, and model effective problem

solving and mathematical practices. Campbell and Malkus (2013), emphasize that to support trusting relationships and develop teachers' pedagogical knowledge, the collaborators need to know how to "establish trusting relationships supporting substantive interactions"(p.221), and such interactions also need not lack "in the level of analysis and reflection needed to advance or change a teacher's understanding or classroom practices" (p.222).

NM PED's Education Evaluation establishes a framework for continuous improvement and professional growth for teachers, domains used to observe and provide feedback that measure classroom practices and teachers' participation in a professional learning community. IN NM understand and are committed to focused and intense PD that encourages teachers to envision reform, which is more likely to improve classroom culture.

Nickerson and Moriarty (2005) explain that, "current reform initiatives call for teachers to establish in their classroom communities of learners where students explore subject matter in depth" (p.117). PD that is engaging and collaborative, in which teachers receive support, enables these teachers to transform their practice and classroom culture. Furthermore, Althauser (2015) explains "intensive, sustained, job-embedded PD focused on content is more likely than is sporadic training to improve teacher knowledge, classroom instruction, and student achievement" (p.211). In other words, collaborative structures provide opportunities to reconceptualize the teaching practice.

For over 30 years, researchers have attempted to define the exact mathematics knowledge needed for teaching, researchers such as Swars and colleagues (2018), agree that "the specialized content knowledge for teaching mathematics extends Shulman's (1986) conceptualizations of subject matter knowledge and pedagogical content knowledge and includes teachers' abilities to analyze and interpret students mathematical thinking and ideas, use representations of mathematical concepts, and define terms in mathematically correct and accessible ways" (p.4).

Passive PD does not alone change a teacher's practice, rather a teacher's active participation in a professional learning community over a period of time promotes a change. Bruce and Flynn (2013) elaborate about the disruption of teaching practice norms needed, "for a teacher's sense of efficacy to shift", (p.693). They explain that engaging in the practice of analyzing lesson videos, reviewing student work and materials, reflecting on the discourse and questioning techniques used, as well as observing master teachers modeling exemplary practices, have a positive effect on teacher efficacy. Additionally, engaging in discourse about how and why the master teacher made certain instructional moves, provides what Bruce and Flynn call teacher efficacy shifts. A shift for change in the environment a teacher creates requires practice, the role of a specialist or leader then is to help mentor and foster such practice. Campbell and Malkus (2013), explain that coaches,

[EXT] Public comment for 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists

Kersti Tyson <kerstityson@gmail.com>

Mon 7/27/2020 4:38 PM

To: FeedBack, Rule, PED <Rule.FeedBack@state.nm.us>;

Cc: Erika Acosta <ejacosta@nmsu.edu>; Christopher Engledowl <chriseng@nmsu.edu>; Snow, Lisa <lisnow@nmsu.edu>; Ted Stanford <thstanfo@nmsu.edu>; Leonard, Zachary A <zleonard@lanl.gov>; Guzman, Wanda <wguzman@nmsu.edu>; Kersti Verna Tyson <kersti@unm.edu>; Tanya Rivers <riverst@wnmu.edu>; Robert Merker <merker.lanl@gmail.com>; Rock, Rodney D <rrock@nmhu.edu>; Megan Kidwell <mk@nmsu.edu>; Carlos Lopez Leiva <callopez@unm.edu>; Sylvia Celedon-Pattichis <sceledon@unm.edu>;

2 attachments

mathematics ed collaborative EMS Rule final.docx; ATT00001.htm;

July 27, 2020

Dr. Ryan Stewart
Secretary of Education
State of New Mexico
Public Education Department
300 Don Gaspar
Santa Fe, New Mexico 87501

Dear Secretary Stewart:

We want to thank the Math and Science Bureau and the leadership at the New Mexico Public Education Department for supporting the development of an Elementary Mathematics Specialist (EMS) Endorsement. We write to you as a collaborative of mathematics educators in New Mexico. We are the professionals who prepare and support experienced teachers to transform mathematics education in New Mexico and we are the professionals who will be preparing and supporting our future Elementary Mathematics Specialists. As leaders in mathematics education, we draw from established best practices and research to inform our work with New Mexico's teachers and our advocacy for creating pathways and competencies that will ensure that New Mexico's instructional leaders in mathematics have the skills and knowledge they need to support all of New Mexico's K-8 teachers to transform mathematics education in our state. Establishing an Elementary Mathematics Specialist Endorsement is an important opportunity for New Mexico and if we want it to contribute to changing the trajectory of children's mathematics education -- and outcomes -- in our state, we need to make sure it is rigorous and forward thinking.

Our collaborative of mathematics educators has grave concerns with the requirements and competencies described in the proposed rule **6.64.19 NMAC, Competencies for Elementary Mathematics Specialists.** If this rule is adopted without revision, it has the potential to weaken the transformative work that needs to happen in our state to change children's opportunities to learn mathematics. We advocate that New Mexico's Elementary Mathematics Specialist Endorsement's requirements and competencies will prepare and verify that mathematics instructional leaders have *developed advanced specialized knowledge and skills in (1) mathematics content knowledge, (2) mathematics pedagogical content knowledge, including effective teaching practices in mathematics, and (3) leadership skills.* In order to have an endorsement that aligns with advances in other states, we need to, at the very least, align with established best practices: AMTE's published standards for Elementary Mathematics Specialists. (https://amte.net/sites/all/themes/amte/resources/EMS_Standards_AMTE2013.pdf. The

purpose of this correspondence is to communicate our disapproval of the rule as written and provide suggestions for modifications.

First, we will provide background and context for why we are advocating for the changes we implore the Public Education Department to adopt. The joint position of the Association of Mathematics Teacher Educators (AMTE), the Association of State Supervisors of Mathematics (ASSM), the National Council of Supervisors of Mathematics (NCSM), and the National Council of Teachers of Mathematics (NCTM) is that Elementary Mathematics Specialists (EMS) are necessary for supporting teachers to develop the content, pedagogy and leadership needed to transform mathematics education. Research has found that:

> EMS professionals have a positive impact on teachers and students. A number of studies describe positive changes in teachers' practice as a result of interacting with an EMS professional, including actively engaging students, emphasizing reasoning and problem solving over skills-based lessons, using students' work to inform instruction, and effectively planning lessons. Studies also support the finding that as EMS professionals gain experience, their work has a significant positive impact on student achievement.
> (see:https://www.nctm.org/Standards-and-Positions/Position-Statements/The-Role-of-Elementary-Mathematics-Specialists-in-the-Teaching-and-Learning-of-Mathematics/).)

The theory of action for establishing an Elementary Mathematics Specialist Endorsement in New Mexico is as follows:

If an EMS Endorsement, comprising competencies for mathematics content knowledge, pedagogical knowledge and skills, and leadership knowledge and skills is established in New Mexico,
And, institutions and partnerships develop robust programs aligned to the competencies, and incentives are provided at the district and state level;
Then, teachers from across NM will engage in professional learning, strengthen their own understanding of best practices and those of their colleagues, and improve mathematics teaching and learning at the systems level.
Then, children's opportunities to learn mathematics will improve and mathematics student learning and achievement will increase.

Our concerns with the proposed rule are that the first three pathways do not align with the competencies nor do they help differentiate and identify the advanced mathematics content knowledge, pedagogy and leadership skills that EMS professionals need as

instructional leaders; and (2) the competencies do not address the advanced mathematical content knowledge EMS professionals need to acquire and that are recommended as best practices in our field. We also strongly suggest that competencies that focus on advanced content knowledge need to be added.

We believe that if the proposed pathways and competencies move forward without major revisions, the pathways will compromise the EMS credential in New Mexico and will jeopardize the potential professionals have to transform elementary mathematics education in New Mexico because the proposed pathways do not align with the proposed competencies. NCTM recommends that certification be advanced and that programs be developed to prepare EMS professionals:

> Districts, states or provinces, and institutions of higher education should work in collaboration to create (1) advanced certification for EMS professionals and (2) rigorous programs to prepare EMS professionals. EMS professionals need a deep and broad knowledge of mathematics content, expertise in using and helping others use effective instructional practices, and the ability to support efforts that help all pre-K–6 students learn important mathematics. Programs for EMS professionals should focus on mathematics content knowledge, pedagogical knowledge, and leadership knowledge and skills. (https://www.nctm.org/Standards-and-Positions/Position-Statements/The-Role-of-Elementary-Mathematics-Specialists-in-the-Teaching-and-Learning-of-Mathematics/).

Below, we will describe our objections to the proposed 6.64.19 NMAC and suggest alternative language that we think more closely aligns to best practices and research, and to what other states have adopted. Our specific recommendations to the proposed regulations are highlighted in yellow.

Recommendations for 6.64.19.6 OBJECTIVE.

We encourage the PED to refine the objective to better align with "The purpose of the proposed new rule 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists," which was described in the public notice for the rule. We agree that the purpose of an EMS "is to allow educators with an elementary education license to add an endorsement specializing in elementary mathematics. The competencies in the new proposed rule provide pathways for educators in school districts and charter schools who are *experts* [emphasis added] in elementary mathematics content and research-based elementary pedagogy to grow and have the potential to be advocates for student learning and support

colleagues and community to ensure equitable mathematics teaching and learning in the classroom, and at the school, school district, charter school, and state levels."

The emphasis for this endorsement needs to focus on the advanced expertise an EMS needs to have to support the transformation of elementary mathematics education in NM.

We encourage you to draw from the above language to describe the objective in the rule. Our suggestion is as follows:

6.64.19.6 OBJECTIVE:

The objective of this rule is to identify competencies and pathways for educators with a Level II or IIIA elementary education license to add an endorsement specializing in elementary mathematics. The competencies (if adapted as suggested) in specialized content knowledge of elementary mathematics, pedagogical content knowledge in elementary mathematics and leadership skills and knowledge help to establish those who are experts and leaders in elementary mathematics education. The requirements in this rule provide ways for individuals to complete programs or demonstrate their expertise that will prepare them to be advocates for teachers' professional development and students' learning. Obtaining an EMS endorsement will help teacher leaders to develop and establish the knowledge and skills they need to support colleagues and community to ensure all students have access to equitable mathematics teaching and learning opportunities, at the classroom, school, school district, charter school, and state levels. The competencies and requirements were developed to ensure alignment with the New Mexico content standards and benchmarks for mathematics and with the national standards of the Association of Mathematics Teacher Educators.

Recommendations for 6.64.19.8.A REQUIREMENTS:

We agree that EMS holders should be experienced elementary teachers. The requirements around holding a level 2 or 3-A teaching license helps establish minimal criteria. However, we recommend that A be streamlined to avoid confusion about the licensure requirements needed to qualify for this endorsement. In addition, we believe that someone with a level II license and a master's from an approved EMS program will not require extra teaching at level II. The requirement of an additional three years could be burdensome and keep qualified individuals from serving as EMS in our elementary schools.

6.64.19.8 REQUIREMENTS:

A. Teachers seeking to add an endorsement as an elementary mathematics specialist to an existing New Mexico level two or level three-A teaching license shall ~~meet the following requirements:~~

(1) hold a level two or three-A Elementary teaching license ~~for a minimum of three years; and~~

~~(2) hold a teaching license in elementary education, as provided in 6.64.4 NMAC and 6.61.2 NMAC.~~

Recommendations for 6.64.19.8.B 1-3 REQUIREMENTS:

Requirements 6.64.19.8.B 1-3 in the proposed rule are problematic and will undermine the intent of this endorsement, which, based on national best practices, is to certify instructional leaders in elementary mathematics instruction. An EMS endorsement should certify advanced specialized knowledge and practices. In California, for example, the endorsement is called "Mathematics Instructional Leadership Specialist." We point this out because if New Mexico is going to align with best practices, it may not look like other endorsements in our state. If the rule is not amended, this endorsement will be one of the weakest endorsements in New Mexico, and it will be one of the weaker EMS endorsements in the US because requirements 1-3 only verify minimal content knowledge and do not assess advanced content, pedagogical and leadership knowledge and skills in mathematics instruction (see: https://sites.google.com/site/emstlonline/state-certifications).

In New Mexico:

- The ENTRY level competencies for a certificate in TESOL, Reading and Technology (for example) expect more than the pathways described for LEVEL II teachers obtaining an elementary mathematics specialist endorsement.
- In TESOL, Technology and Reading, for entry level teachers to obtain the endorsement, they are required to major in the specialty. An endorsement in any of these areas requires 24-36 hours of coursework in the specialty area. We recommend that the EMS endorsement be differentiated from other endorsements in New Mexico and that coursework for obtaining an EMS endorsement be at the graduate level to reflect the advanced nature of the work of instructional leadership in New Mexico.
- In other endorsements in New Mexico, when teachers want to add an endorsement once they are licensed, they can take a test -- that aligns with the competencies for that endorsement -- to demonstrate their knowledge. We would also like to note that the TESOL requires a test plus 12 hours of additional coursework. The EMS endorsement, as proposed, requires passing a content test for teaching middle grades mathematics, knowledge that is necessary for EMS instructional leaders, but

is not sufficient for establishing the depth of knowledge an EMS instructional leader needs to have to be effective. The Praxis Middle grades content exam is appropriate for helping to determine if pre-service teachers who want to teach middle school mathematics have the entry level content knowledge they need to teach mathematics.

We would also like to acknowledge that one of the challenges that many states face is that a test has not been created (although there are some promising initiatives) that aligns with the advanced EMS standards in mathematics content, pedagogy and leadership. We recognize that the lack of a rigorous test makes it more difficult to verify the expertise that current professionals who have been doing mathematics instructional leadership in our state have developed. As the proposed rule stands, having teachers pass the middle school mathematics content knowledge assessment offered by Praxis does *not* assess pedagogical content and leadership knowledge and skills described by the competencies, and minimally assesses the content knowledge an EMS instructional leader needs. If PED requires a standardized test, we recommend that teachers also submit documentation that demonstrates how they meet the competencies for advanced mathematics content knowledge, pedagogy and leadership (with suggested amendments) (See Appendix A for suggestions). The middle school mathematics content knowledge assessment offered by Praxis provides a way for the state to assess candidates' *entry* level content knowledge in Algebra and Geometry, and while we value this knowledge as important understanding for an EMS to possess, it in no way addresses whether or not a teacher has developed the competencies in elementary mathematics content, pedagogy and leadership described in this proposed rule (with suggested amendments), much less the specialized content knowledge that an EMS candidate must possess about topics in K-6 mathematics.

Reccomendations for 6.64.19.8.B (1)

We propose that the following pathway be revised as follows:

6.64.19.8.B (1) Complete 30 semester hours in a department-approved graduate level professional program designed for elementary mathematics instructional leaders and who pass the middle school mathematics content knowledge assessment offered by Praxis as a part of their entrance requirements to the program;

We recommend that New Mexico align their program approval standards with California's work in this area in addition to ensuring that the 18 hours of course work described in 6.64.19.8 (4) are incorporated in the graduate program. See: https://www.ctc.ca.gov/docs/default-source/educator-prep/standards/mathematics-specialist-pdf.

If the proposed language is not clarified and strengthened, then it could be interpreted that this "professional preparation program" could be an undergraduate teacher preparation program. Having such a pathway would mean that all elementary teachers who pass an Algebra and Geometry assessment (the Praxis middle school math exam) could be Elementary Mathematics Specialists, thereby requiring no specialized knowledge, and undermining the work that needs to be done to support teachers to lead the way in transforming students' opportunities to learn mathematics in New Mexico in ways that align with National and research-based standards and best practices.

Recommendations for 6.64.19.8.B (2)

New Mexico has many dedicated teachers who have spent time, effort and money to develop expertise as mathematics instructional leaders, and we applaud the PED for being open to an experience-based pathway that honors the initiative of teachers who go above and beyond to hone their professional skills and knowledge. However, we believe that the pathway must somehow document how the candidate meets the proposed competencies (with suggested edits) in content, pedagogy and leadership described in this rule. Therefore, we suggest that documentation of the competencies in the form of a portfolio be the focus of this pathway (see Appendix A).

Recommendations for 6.64.19.8.B (3)

All endorsements in New Mexico have a National Boards pathway. We support National Boards and recognize the high standard it holds for verifying advanced pedagogy in the teaching profession. The proposed rule indicates that teachers can pass the Praxis Middle School content test OR National Boards. The two are in NO way equivalent, and to have such an equivalency in a rule undermines the EMS as well as National Boards. Having content knowledge in Geometry and Algebra says nothing about an individual's advanced mathematics content, pedagogical content knowledge with regards to elementary mathematics, nor their leadership skills and knowledge, the essential competencies required of someone seeking an EMS endorsement. In addition, because there is no comparable National Board pathway for the EMS, we recommend that a teacher who holds a National Board Certificate needs to also demonstrate proficiency in the specialized knowledge of instructional leaders in this area, such as through an approved program as described in 6.64.19.8.B (1) and (4) (if suggestions are accepted) or by submitting a portfolio that demonstrates their advanced knowledge in elementary mathematics content, pedagogy and leadership, that was described above.

Recommendations for 6.64.19.8.B (4)

We think that the fourth option is a promising and reasonable pathway for supporting individuals to develop and establish mathematics pedagogical leadership and that the pathway as it is described (with a few suggested refinements to keep the focus on mathematics) has the potential to support experienced teachers to develop the advanced skills, knowledge and practices for becoming an EMS in NM. We suggest the following refinements to this requirement:

(4) Complete 18 graduate level semester hours in a department-approved program that aligns with the competencies described in this regulation, and that include the following components:

> **(a)** three semester hours of multicultural mathematics education, which shall include substantive methods for supporting all learners in accessing relevant mathematics instruction;

(b) six semester hours of early mathematics development, including pre-number concepts, Early Number Sense, Base-Ten Place Value System, Operations on whole numbers to build understanding of operations on fractions, mixed numbers, and decimals, and Early Algebra, Geometry and Measurement, and Data Analysis.

(c) three semester hours in mathematics pedagogical content knowledge, which shall include learning, teaching, curriculum, and assessment;

(d) three semester hours of mathematics leadership, which shall cover topics of leadership knowledge and skills; and

(e) three semester hours of practicum, which shall include mathematics leadership challenges and issues that mathematics leaders encounter. The practicum experience shall include 35 hours of field experience shadowing a mathematics specialist or completing job-like activities in addition to participating in various projects, readings, and discussions as a member of a class.

Recommendations for 6.64.19.9, 6.64.19.10 and (proposed) 6.64.19.11

Finally, we made minor edits to the pedagogy and leadership competencies in 6.64.19.9, 6.64.19.10 and we strongly urge the adoption of: 6.64.19.11 ADVANCED KNOWLEDGE OF ELEMENTARY MATHEMATICS (see appendix B) in order to support teachers to develop the expertise they need to support teachers and students to thrive in mathematics.

We thank you for considering these suggestions. Based on our research of best practices in other states, national standards and recommendations, and research on mathematics

education and EMS, we believe our recommended revisions will help to lay the foundation needed to change the landscape in mathematics education in the state of New Mexico.

With regard,

The New Mexico Mathematics Education Collaborative

Kersti Tyson, Ph.D., Director of Evaluation and Learning, LANL Foundation & Associate Professor in Mathematics Education at UNM

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Appendix A: Elementary Mathematics Specialist Endorsement Proposed Portfolio Assessment

Elementary Math Specialist (EMS) Endorsement-Portfolio Assessment

Candidates in the NMSU-EMS program will obtain an EMS endorsement through the completion of 18 credit hours of coursework that meets the competencies and performance standards, including a capstone project. The EMS team is actively discussing and open to feedback pertaining to other alternative routes to obtain an EMS endorsement

Proposal: The EMS state team proposes that one route to demonstrating understanding or obtaining an elementary math specialist endorsement be through an **EMS portfolio**.

Approach: EMS Portfolio demonstrating the candidate is a reflective practitioner and has competency in

- Instructional Leadership
- Advanced Pedagogical Knowledge and Practices for Teaching Mathematics to Culturally and Linguistically Diverse Children
- Comprehensive Knowledge of Elementary Mathematics

An EMS Portfolio would be composed of:

- Transcripts
- Degrees
- Certificates
- compilations of classroom data, videos of relevant work, analysis and other components, as appropriate

By completing a portfolio potential EMS holders would demonstrate their commitment to on-going professional development and learning.

Applicability: A portfolio approach to demonstrating competency would be applicable to any teacher holding a level 2 New Mexico teaching license.

Review and Approval of Portfolio:

Portfolios to be reviewed by NMPED, their contractors, or assignees as determined by NMPED. Final approval of portfolios to be by NMPED.

Proposed Possible Components of EMS Portfolio

Demonstrate Instructional Leadership

- Action research/writing component
- Video record and reflective analysis of one or more instructional leadership activities
- Data (e.g., video, written documentation, interview data) regarding outcomes of instructional leadership activities
- Resources (e.g., texts, protocols, bibliography, etc.) used to support your instructional leadership activities
- Transcripts, certificates, or degrees relevant to instructional leadership, as appropriate

Demonstrate Advanced Pedagogical Knowledge and Practices for Teaching Mathematics to Culturally and Linguistically Diverse Children

- Action research/writing component
- Video record and reflective analysis of two or more mathematics teaching practices
- Data (e.g., video, written documentation, interview data) of advanced pedagogical practices for teaching mathematics
- Resources (e.g., texts, protocols, bibliography) used to support your use of advanced pedagogical knowledge and teaching practices
- Transcripts, certificates, or degrees relevant to knowledge of practices for teaching mathematics, as appropriate

Demonstrate Comprehensive Knowledge of Elementary Mathematics

- Action research/writing component identifying connections and progressions for one strand of elementary mathematics across grade levels
- Video record and reflective analysis demonstrating knowledge of elementary mathematics (e.g., analysis of student work, providing professional development for elementary mathematics teachers, discussing content deeply with students)
- Resources (e.g., texts, protocols, bibliography, etc.) used to support your knowledge of elementary mathematics
- Transcripts, certificates, or degrees relevant to knowledge of elementary mathematics, as appropriate

The primary goal of the EMS team is to improve students' mathematics achievement by providing viable pathways to increase the number of teachers that have Elementary Mathematics Specialist endorsements and have the capacity to serve in their schools and districts as mathematics education leaders.

Appendix B:

6.64.19.9 COMPETENCIES FOR ELEMENTARY MATHEMATICS SPECIALISTS: Leadership Knowledge and Skills:

(1) The elementary mathematics specialist takes an active role in their own and other teachers' professional growth by participating in professional development opportunities that directly relate to the learning and teaching of mathematics and to their development as a mathematics instructional leader, which may include participating in professional networks, journals, and discussion groups, among other opportunities. The opportunities shall also include occasion to stay informed of:

(a) critical issues in elementary mathematics;

(b) national, state, and school district or charter school policy initiatives;

(c) research- and evidence-based best practices for elementary math instruction;

(d) characteristics of high-quality curriculum;

(e) features of high-quality instructional materials; and

(f) qualities of superior professional learning and best practices for designing adult learning environments.

(g) best practices in culturally and linguistically responsive pedagogies for teaching mathematics.

(h) understand power and privilege in the history of mathematics education by (1) being aaware of the national, state, district, and school contexts for educating students and engage in conversations to address inequitable learning opportunities. (2) being well grounded in literature that presents strategies for transforming schooling for students who have historically been denied access to a quality mathematics education and implement these practices in their classrooms and schools.

(2) The elementary mathematics specialist shall engage in and facilitate continuous and collaborative learning with colleagues,, drawing upon research in mathematics education to:

(a) inform practice and enhance learning opportunities for all students' mathematical knowledge development;

(b) support teachers to enact equitable high quality mathematics instruction

(b) design and implement collaborative structures to build teacher capacity; and

(c) collaborate to create a shared vision and school improvement plan of mathematics teaching and learning among educational professionals, families, and various stakeholders, that embrace high achievement for all students.

(3) The elementary mathematics specialist shall act and communicate professionally with school and school district or charter school teams to assure high-quality mathematics instruction, including:

(a) evaluate alignment of instructional materials to state standards and required assessments and make recommendations for addressing learning and achievement gaps;

(b) engage in discussions and decision-making to establish appropriate benchmarks and trajectories for student learning goals from K-6;

(c) review curriculum and instructional materials for cultural and linguistic responsiveness and make recommendations to enhance culturally and linguistically diverse students' access to high-quality mathematics materials;

(d) determine the suitability of mathematics curricula and teaching materials (e.g., textbooks, technology, manipulatives) for particular learning goals and trajectories;

(e) provision appropriate tools and resources targeted to meet specific individual student needs;

(f) collaborate with school-based professionals to develop evidence-based interventions for high- and low-achieving students; and

(g) collaborate with teachers and school administrators to secure additional resources as needed to maintain high expectations in mathematics classes for all students.

(h) Ethically advocates for elementary-grades students to have access to and advance in mathematics that cultivates positive mathematics identities and connects to students' mathematical thinking and lived experiences; build partnerships with families and communities and work to eliminate institutional and curricular barriers to learning.

(4) The elementary mathematics specialist shall plan, develop, implement, and evaluate professional development programs that assist teachers in using resources from professional mathematics organizations and support teachers in systematically reflecting and learning from practice in order to enhance culturally and linguistically diverse students' access to equitable high quality mathematics instruction .

(5) The elementary mathematics specialist shall establish and maintain learning communities, such as professional learning communities or collaborative communities of practice..

(6) The elementary mathematics specialist shall mentor new and experienced teachers to better serve students in terms of mathematics instruction and classroom support.

(7) The elementary mathematics specialist shall nurture a culture of productive professionalism by:

(a) modeling a growth mindset and productive disposition toward mathematics teaching and learning for all staff and students;

(b) supporting a culture of reflection, refinement, and action focused on continuous improvement in classroom best practices;

(c) fostering a culture of collective responsibility and a school climate that treats students as holistic beings;

(d) promoting the use of data analysis to drive decisions around mathematics instruction; and

(e) communicating and working with school staff, administrators, families, and various stakeholders to create mutually beneficial partnerships and a shared vision of mathematics teaching and learning.

[6.64.19.9 NMAC – N, 8/25/2020]

6.64.19.10 PEDAGOGICAL KNOWLEDGE FOR TEACHING MATHEMATICS:

A. To promote and advocate for equitable, high-quality mathematics instruction for all students, the elementary mathematics specialist shall collaborate with teachers and administrators in supporting the diversities of the classroom and school, including cultural, disability, linguistic, gender, socioeconomic, and developmental, to:

(1) address issues of access and advancement in mathematics at the individual student, classroom, school, school district, and charter school levels;

(2) establish clear goals within individual student learning progressions in mathematics that utilize and build upon learners' existing knowledge, skills, understandings, conceptions, and misconceptions to advance learning and use the goals to guide instructional decisions;

(3) purposefully construct guidelines and support for promoting a mathematics learning culture within the classroom environment, including specific routines and instructional strategies that help cultivate positive mathematics identities for all students;

(4) design student learning opportunities that:

(a) promote engagement in productive struggle and collaborative problem solving and extend the meaning and usefulness of mathematics in students' daily lives;

(b) intentionally reward effort in mathematical learning;

(c) allow space for all students' mathematical sense-making and include multiple entry points into problem solving;

(d) engage all students in making connection among mathematical representations to deepen understanding of mathematical concepts and procedures as tools for problem solving;

(e) provide ample opportunity for all students to engage in academic discourse around mathematical problem solving as well as for individual

expression in problem solving, such as through oral or written explanation or sharing of mathematical thinking;

(f) utilize purposeful questions to assess and advance all students' reasoning and sense-making about important mathematical ideas and relationships;

(g) diagnose and leverage mathematical misconceptions and errors to design appropriate learning opportunities that support all students' mathematical conceptual development, understandings, and identities;

(h) integrate the use of appropriate mathematical tools and technology as essential resources to support students in making sense of mathematical ideas and communicating their mathematical thinking;

(i) encourage mathematical explorations among peers to extend learning opportunities; and

(j) assess all student abilities, through formative and summative assessments, and develop actionable strategies to help all students fill in learning gaps; and

(5) Reflect and take action to adjust instructional approaches characterized by:

(a) the use of evidence to adjust mathematics instruction continually in ways that support and extend learning for all students, including differentiation and enrichment;

(b) the use of strategies deliberately designed to support specific groups of student learners in mathematics; and

(c) organized support of delivery of developmentally appropriate instruction that is responsive to individual learners' needs and interests in mathematics.

B. To promote pedagogical shifts and professional growth for self and teachers, the elementary mathematics specialist shall:

(1) model effective problem solving and the mathematical practices, including questioning, representing, communicating, conjecturing, making connections, reasoning and providing, and self-monitoring, and cultivate the development of such practices in all learners;

(2) model and support teachers and students in the use of technical language associated with mathematics, attending to both mathematical integrity and usability by learners;

(3) support the use of various instructional applications of technology that are evidence-based and are developmentally-, mathematically-, and pedagogically-grounded;

(4) research and share evidence-based instructional formats that support all students in accessing mathematical problems, including whole group, small group, partner, and individual, and that support success in achieving specific student learning goals;

(5) support teachers in their analysis and evaluation of student ideas and work, and design appropriate responses to support and further student mathematical learning, aligned to individual goals;

(6) apply learning trajectories related to mathematical topics and collaborate with teachers to sequence activities and design instructional tasks and assessments;

(7) support teachers in the use of the formative assessment cycle, which includes administering a formative assessment task, analyzing student responses to the task, and designing and re-teaching lessons based on this analysis; and be able to find or create appropriate resources for this purpose;

(8) support teachers in the use of multiple assessment strategies, including, but not limited to listening to and observing students making sense of mathematics, and in analyzing, choosing, designing, and adapting assessment tasks for monitoring student learning and to assess students' mathematical knowledge, based on students' individual learning goals and expressions and demonstrations of understanding; and

(9) support teachers in the analysis of formative and summative assessment results and communication of results to students with actionable feedback and to appropriate and varied audiences for further support in making instructional decisions.

6.64.19.11 ADVANCED KNOWLEDGE OF ELEMENTARY MATHEMATICS:

The EMS professional recognizes the importance of elementary mathematics and its foundational role in helping children to develop fluidity and flexibility with numbers, operations, fractions and geometric and algebraic thinking. A confident and competent EMS

professional will not only possess the following knowledge and skills but will support the growth and development of teaching professionals in these areas.

A. General Mathematical Abilities

(1) Demonstrate understanding of students' mathematical development along various learning trajectories including knowledge of how students make sense of specific concepts within the trajectory.

(2) Draw connections between key concepts within and across grade-levels.

(3) Appraise, recognize and identify common preconceptions, misconceptions, and knowledge gaps in student understanding as they progress along a learning trajectory.

(4) Use problem solving as a knowledge building tool.

(5) Support students in reasoning about quantities in contextual and abstract situations.

(6) Apply mathematics to solve real-life problems, supporting students in learning to identify the important quantities in a practical situation.

(7) Understand that students being able to verbalize their mathematical assumptions and generate viable arguments is a part of the sense-making process that builds understanding.

(8) Help students learn to critique the reasoning of others and ask questions to move learning forward.

B. Number and Operations

EMS Professionals have deep and extensive knowledge of the foundational number and operation concepts of elementary school. They also have a deep and extensive knowledge of how children come to understand number and operations. They have repertoires of strategies, approaches, lessons, and rich environments that will lead students to deeper understanding. EMS professionals know how to help their colleagues and other teaching professionals develop these same abilities.

(1) Pre-number concepts:

(a) Demonstrate a deep understanding of the development of non-quantified comparisons (less than, more than, the same), containment, 1-to-1

correspondence in matching set elements, pattern recognition, cardinality, meaningful counting, and ordinality.

(b) Understand how pre-number concepts can be used throughout the grade levels in the development of number, operation, measurement, and early algebra.

(2) Early Number Sense

(a) Know how students develop the concept of a unit of one and how that progresses to understanding number as quantity.

(b) Implement knowledge of learning trajectories concerning number concepts that support development of counting and seeing number relationships (abstract composite units), progressing to development of sophisticated strategies for solving problems involving operations.

(c) Understand how abstract understanding builds from concrete experiences and understanding.

(d) Use knowledge of children's progress from concrete and representational understanding to competent use of symbolic notation to guide and plan instruction.

(e) Effectively utilize the principle of moving back and forth along the concrete-representational-abstract continuum, recognizing that the development of abstract thinking takes time and repeated exposure.

(3) Base-Ten Place Value System

(a) Apply knowledge of the structure of the base-ten place value system to develop students' foundational understanding of the system.

(b) Link strong understanding of early concepts of tens and ones when introducing place value notation; continue to add to and build on strong conceptual understanding as notation involving larger numbers is introduced.

(c) Support development of students' strategies for comparing and ordering numbers that utilize place value understanding.

(d) Provide rich opportunities to connect place value understanding and estimation.

(e) Provide experiences, models, and opportunities to make representations that develop conceptual understanding of very large and very small numbers.

(f) Link students' conceptual knowledge of tens and ones to their student-generated strategies to solve problems involving operations; extend this practice to include larger numbers.

(g) At the appropriate grade levels, provide opportunities for students to apply strong conceptual understanding of place value and properties of operations to deconstruct strategies (standard as well as student invented) as accurate, efficient and generalizable.

(4) Operations

(a) Understand how to recognize demonstrated understanding of operations across grade levels; plan instruction that takes into account current understanding and engenders opportunities for advancement.

(b) Support connections between conceptual and procedural understanding of number, operation, and properties (sets, number lines, groups, arrays, etc.) by

(i) Drawing upon a robust repertoire of number and operation models.

(ii) Drawing upon a well-honed practice of using multiple interpretations and representations of operations (beginning with whole numbers).

(iii) Applying a deep understanding of properties of the four operations of arithmetic (beginning with whole numbers).

(iv) Recognizing and utilizing similarities and differences between various representations

(c) Support the development of students' flexibility with multi-digit calculations, including mental math, standard algorithms and non-standard strategies commonly created by students.

(d) Recognize students' informal reasoning used in calculations.

(e) Synthesize multiple strategies to support fundamental understanding of operations, properties, and the base-ten place-value number system to strengthen students' conceptual understanding of how and why strategies work.

(f) Support students' recognition of addition and subtraction and multiplication and division as inverse operations.

(g) Understand how children's developing understanding of fractions, mixed numbers, and decimals is interconnected, and fits into the larger, more advanced framework of rational numbers.

(h) Build on conceptual understanding of operations on whole numbers to build understanding of operations on fractions, mixed numbers, and decimals.

(i) Use number lines to develop students' understanding of relationships between whole numbers, fractions, mixed numbers, and decimals.

(j) Utilize appropriately a variety of notations to represent numbers and operations.

(k) Identify students' position on the foundational progression from additive reasoning to multiplicative reasoning.

(l) Employ instructional approaches that facilitate development of conceptual understanding of multiplication including:

- **(i)** Using increasingly sophisticated concrete models, connected to symbolic notation as understanding develops.
- **(ii)** Using models to deconstruct properties of operations.
- **(iii)** Developing flexible understanding of factors and multiples.
- **(iv)** Providing opportunities for students to generate strategies and representations when solving multi-digit problems.

(m) Utilize multiplicative comparison in a variety of ways, using both whole numbers and positive rational numbers.

(n) In developing and planning of lessons, utilize the conceptual progression from multiplicative comparison to scale factor.

(o) In developing and planning lessons, utilize the connection between division, ratios, and rates.

C. Early Algebra

EMS professionals know how to use the foundation of elementary mathematics to help children begin to build the sense-making in algebra that they will need in later grades. EMS

professionals know how to help their colleagues and other teaching professionals develop these same abilities.

(1) Expressions and Equations

(a) Know ways to help children move from writing single operations to writing numeric expressions which may use several operations.

(b) Know ways to help children build on numeric expressions to effectively write and use algebraic expressions.

(c) Be able to select real-world contexts and applications where children develop the ability to model with expressions and equations.

(d) Be able to select real-world contexts and applications where children can make sense of algebraic concepts through contextualization and decontextualization.

(e) Understand how children can use their understanding of the properties of operations to make sense of equivalence of expressions.

(2) Variables

(a) Capitalize on instances of "finding an unknown value" in different mathematical situations and across grade-levels to build students' understanding of using a variable as an unknown value.

(b) Understand how properties of operations, and other general mathematical statements, may be efficiently represented with variables. Also know other ways to represent and explore these properties. For example, represent the distributive property as $A \times (B + C) = (A \times B) + (A \times C)$, and also using groups, arrays, number lines, and contextual situations.

(c) Leverage student experience in describing patterns to support students' representing relationships using variables, and also in other ways. For example, the same relationship between x and y may be expressed as $y = 2x + 1$, with a table, a graph, a contextual situation, a series of geometric shapes, etc.

(3) Functions

(a) Leverage the concept of function and familiarity with basic types of functions to support student curiosity about higher mathematics.

(b) Recognize and facilitate the connection between concepts from elementary school with an understanding of functions in high school. For example, using known quantities to find unknown quantities, making tables, and drawing coordinate graphs.

(c) Relate elementary school mathematics with later understanding of functions using both mathematical and real-world contexts.

D. Geometry and Measurement

EMS professionals know the foundational ideas of geometry and measurement, and how children develop these ideas over time. They recognize and utilize many connections between geometry and measurement, and number and operation. EMS professionals know how to help their colleagues and other teaching professionals develop this same knowledge.

(1) Composition and decomposition

(a) Support students' development of geometric structure and spatial reasoning using composing and decomposing figures. For example, in early elementary school, students might decompose a square into two congruent right triangles. In later grades, they might decompose a more complicated polygon into many triangles which may or may not be congruent.

(b) Recognize and leverage connections between composing and decomposing figures in geometry, decomposing numbers, combining and separating sets, etc. to strengthen students' sense making in different mathematical situations.

(2) Congruence and similarity

(a) Leverage the intuitive idea of congruence, which begins in pre-K with matching or sameness, as a means for building geometric understanding throughout the grade levels. For example, two squares of the same size are congruent, even if one is rotated to look like a diamond, because they can be physically moved to match up exactly with each other.

(b) Demonstrate how the early, intuitive idea of congruence is made more precise in the study of geometric transformations in middle school and high school.

(c) Understand ways in which a rich problem-solving environment, with connections between multiplicative comparison and geometry, lays the

foundation for understanding geometric similarity in middle school and high school.

(d) Employ strategies to develop students' mathematical language with regard to different kinds of sameness: equality, congruence, equivalence, similarity.

(3) Shapes and Figures

(a) Have a full repertoire of activities and lessons that utilize different kinds of polygons and other shapes to help children at different grade levels develop spatial reasoning, logic, and language abilities.

(b) Connect shapes and figures to measurement. Demonstrate how measurement allows children to make sense of shapes, and also how shapes may be used as tools and models for measurement.

(c) Choose appropriate shapes for activities and lessons that help children explore geometric concepts such as congruence, symmetry, and regularity.

(d) Effectively use a variety of materials, tools, and strategies for helping children construct, explore and reason about shapes.

(4) Measurement Quantities

(a) Explain ways that students learn, over time, to understand the geometrical nature of length, area, volume, and angle.

(b) Leverage the properties of geometric measurement quantities (length, area, volume, angle) to support the development of children's sense-making about operations.

(c) Employ time as a measurable quantity in lessons and activities in a way that allows children to deepen their mathematical understanding of number and operation.

(d) Show how children can use other measurement quantities (e.g. mass, money, temperature) in ways that strengthen their mathematical understanding.

(5) Measurement Concepts

(a) Demonstrate an understanding of how pre-number measurement concepts, such as direct and indirect comparison, are foundational to children's understanding numerical measurement concepts.

(b) Recognize developmental issues in measurement, such as the need for same-size units, and the problems with gaps and overlaps.

(c) Know the limitations and affordances for children of different types of measurement tools.

(d) Know multiple strategies, activities, and lessons for helping students at different grade levels make meaningful comparisons between measurement units. For example, "I am more centimeters tall than inches tall" eventually leads to an understanding of using multiplication to convert inch measurements to centimeter measurements.

(e) Draw upon knowledge concerning common units of geometric measurement to support students' spatial reasoning, problem solving and communication skills.

(6) Plane Coordinates

(a) Know multiple ways to introduce and explore coordinates.

(b) Understand how beginning learners can effectively utilize coordinates in exploring and reasoning about shapes and their properties.

(c) Know appropriate activities that relate coordinates with maps or diagrams, and how these activities can deepen mathematical understanding and connections.

(d) Have a repertoire of strategies for helping students use coordinates to explore early algebra.

E. Data Analysis

EMS professionals understand how measurement and data ideas from elementary school build into an understanding of variability, and of probability and statistics, in later grades. They have a repertoire of strategies and lessons for helping children build data sense, and for connecting data sense with other domains of mathematics. EMS professionals know how to help their colleagues and other teaching professionals develop this same expertise.

(1) Understand how to help children generate questions that lead to mathematically rich data.

(2) Effectively facilitate discussions with children about different data types (categorical, measurement), and how to collect and analyze them.

(3) Show proficiency in working with children to set up a data investigation.

(4) Understand the affordances for children of different types of data representation, and their connections with other domains of mathematics.

(5) Choose lessons and activities with an awareness of important statistical concepts in later grades (e.g., using line plots to build later understanding of data distributions).

[EXT] Public Comment on rule 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists

Chris Engledowl <chriseng@nmsu.edu>

Mon 7/27/2020 4:59 PM

To:FeedBack, Rule, PED <Rule.FeedBack@state.nm.us>;

2 attachments

image005.png; ProposedRule6.64.19_EMScompetencies_PublicComment.pdf;

New Mexico Public Education Department,

Please find attached my written comments on proposed rule 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists. Thank you for the opportunity to comment on this important new development in New Mexico. I value your work in developing an endorsement for an Elementary Mathematics Specialist.

Sincerely,

Christopher Engledowl

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School of Teacher Preparation, Administration and Leadership
575-646-1762
200G O'Donnell Hall

To: New Mexico Public Education Department
From: Christopher Engledowl, Assistant Professor of Mathematics Education, NMSU, Las Cruces
Date: July 27, 2020
Subject: Response to Proposed Rule 6.64.19 NMAC, Competencies for Elementary Mathematics Specialists

First, I want to extend my gratitude to the Math and Science Bureau as well as the NMPED leadership for their support and consistent open communication on the development of the proposed Elementary Mathematics Specialist (EMS) endorsement. In many other states, such an endorsement has been found to lead to important and meaningful positive changes in the mathematics education of elementary students and I believe it has great potential for bearing a similar impact on the students and schools in New Mexico.

As an Assistant Professor of Mathematics Education at NMSU, I have had the great privilege of interacting with preservice and inservice teachers as an instructor in undergraduate and graduate coursework, professional development, and research projects—including one focused on EMSs in Missouri. Across these different contexts, I have seen the great passion that teachers and prospective teachers in New Mexico have for teaching, as well as the great desire to improve their own mathematical content knowledge, pedagogical knowledge, and leadership skills so they might have a more positive impact on their students, schools, and communities. It is for these reasons that I joined many others across the state in an effort to create a pathway for an EMS endorsement. In my role on this team, I collaborated in the conceptualization, writing, and revising of the competencies for the EMS endorsement. This process involved gathering EMS-specific standards documents, as well as position statements on the importance of EMSs, produced by the National Council of Teachers of Mathematics (NCTM), the Association of Mathematics Teacher Educators (AMTE), the Association of State Supervisors of Mathematics (ASSM), and the National Council of Supervisors of Mathematics (NCSM). It also involved exploration of research conducted with EMSs, as well as discussions with experts who focus their research around EMSs and an external review from one such expert prior to the final submission of the competencies. Moreover, I participated in multiple conversations with Math and Science Bureau staff as well as members of the NMPED leadership. These conversations also included discussions of the types of assessments that would be appropriate to ensure that the endorsement was held to high standards aligned with research-based criteria for what makes a high quality EMS.

It is from this background that I offer my comments on the proposed rule **6.6419 NMAC, Competencies for Elementary Mathematics Specialists**. All available standards documents and position statements, as well as current research-based best practices, recommend that an Elementary Mathematics Specialist have a deeper, specialized content knowledge, pedagogical content knowledge, and leadership, as it relates to the teaching and learning of mathematics at

the elementary level. However, as proposed, rule 6.64.19 does not uphold the expectations of these documents and what research has found to be best practices. There are two weaknesses that should be addressed prior to this rule being approved:

1. The competencies for mathematical content knowledge should be reinstated.
2. The pathways to the EMS endorsement should be aligned with the competencies and encompass robust evidence of elementary mathematics content knowledge, pedagogical knowledge, and leadership.

The competencies relating to mathematics content knowledge that were initially submitted were specific to what an EMS should know (we drew heavily on AMTE's published standards for EMSs for these), and not what a newly-minted elementary teacher should know (which would involve such documents as AMTE's newly updated standards for preservice teachers and the older, but still relevant, Mathematical Education of Teachers II report). If the competencies were to be put into rule without the inclusion of the *specialized* content knowledge expected of EMSs—which is beyond that of a non-specialist—I believe that the EMS endorsement will be substantially weakened. Not only are the pathways dependent on the competencies, but institutions are beholden to providing an education aligned with the competencies. The reinstatement of the mathematics content competencies would ensure that teachers develop the vital specialized content knowledge of the mathematics that elementary students need and the ways that they develop their knowledge—whether productive or not.

Regarding the pathways, among the four that were presented, only B.4 appears to align with the proposed competencies. In particular, pathways B.1 and B.3 side-step the important specialized content knowledge that an EMS is expected to have in relation to *elementary mathematics content* by requiring evidence of middle school mathematics content knowledge. This is counter to what organizations like NCTM, AMTE, and NCSM recommend. Because an assessment encompassing this specialized knowledge currently does not exist, I recommend that a portfolio system be implemented—similar to how teachers are currently assessed prior to approving a change in licensure level.

In a different way, pathway B.2 does not align with the proposed competencies because it is too vague to capture the advanced, specialized mathematics content knowledge, pedagogical content knowledge, and leadership skills expected of an EMS. In order to uphold the quality of the EMS endorsement, there must be documentation of the competencies in some form. A portfolio system would ensure the integrity of the intent of the competencies and the endorsement.

Pathway B.4 is the most promising of the pathways and provides a fairly robust set of expectations that appears aligned with all competency domains (mathematics content knowledge, pedagogical content knowledge, leadership). However, a few revisions would strengthen the connection to the competencies and ensure a high level of accountability to the competencies.

First, **B.4.a** should include the specific mathematics domains that the 6 hours of early mathematics development should encompass: pre-number concepts; early number sense; base-ten value system; operations on whole numbers building to fractions, mixed numbers and decimals; early algebra; geometry and measurement; and data analysis and probability. Moreover, **B.4.d** should clarify that it should be leadership related to mathematics education, such as "three semester hours of *mathematics* leadership, which shall cover topics of leadership knowledge and skills" (emphasis added to show the added language). The reason for this recommended change is that research has documented that even when EMSs do not take up formal roles as leaders charged with directing the mathematics teaching, mathematics learning, mathematics assessing, and mathematics curricular decisions, they are made into informal leaders in their buildings by their peers whether they want to or not. Thus, the leadership skills that they need are inherently grounded in the specialized mathematics knowledge that characterize an EMS and therefore need leadership knowledge and skills that are grounded in the teaching and learning of mathematics. It is for this same reason that **B.4.e** should be revised to read "three semesters of practicum which shall include *mathematics* leadership challenges and issues that mathematics leaders encounter" (emphasis added to show the added language).

The development of an Elementary Mathematics Specialist endorsement holds great promise in the equitable improvement of the mathematics education of all students and schools in New Mexico. As a mathematics teacher educator in New Mexico, I thank you for your consideration of these changes to proposed rule **6.64.19 NMAC, Competencies for Elementary Mathematics Specialists**, and I thank you as you work to ensure high standards of teachers and equitable and high quality mathematics learning experiences of the students of New Mexico.

Sincerely,

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