Mathematics Curriculum Literacy Competency Framework

Overview

As more and more school districts adopt and implement high-quality instructional materials (HQIM) there is an immediate need for Educator Preparation Programs (EPPs) to shift coursework from the designing of mathematics units and lessons to the internalization and effective implementation of HQIM. These materials allow new and novice educators to systematically implement research based instructional strategies in mathematics, thereby ensuring that all students receive access to rigorous grade appropriate Tier 1 instruction. With HQIM, educators no longer need to design or source materials from unvetted sources, which can lead to students receiving instruction that lacks rigor and is below their grade level. Instead, educators can focus their time on lesson internalization, data analysis, skillful customization, and plan for their overall execution of lessons.

Characteristics of Mathematics HQIM:

- HQIM provide educators with lessons and units that pursue rigor by **balancing conceptual understanding, procedural skill, and fluency,** so that students can **apply this understanding to real world application problems.**
- HQIM help educators focus on math content aligned to the rigor of state standards, **while concentrating time and effort** on the **most important topics** for the grade level.
- HQIM **connect concepts within and across grades** along a strategic progression of learning so that new understandings are built on previous foundations. **Mathematics tells a continuous and connected story for students.**
- HQIM provide educators with activities that engage students in **productive struggle.** Students get multiple opportunities to practice, discuss, represent and write about mathematics concepts.
- HQIM provide educators with **formative assessments** for each lesson, unit and sub-unit so that they can adjust instruction based on student misconceptions.
- Since HQIM are designed with **evidence-based best practices in mathematics**, HQIM can be **educative for educators** in building their pedagogical content knowledge.

Essential Competencies to Prepare Aspiring Educators to Effectively Implement Math HQIM

Competency 1: Aspiring educators should understand how HQIM contributes to better learning outcomes for students and understand their responsibility to be skillful users of curriculum rather than designers of instructional materials.

What do aspiring educators need to know and be able to do?

- Understand the mathematics standards for their state and how the instructional materials are aligned to these standards.
- Understand the research based instructional strategies in mathematics and how HQIM is designed to align with the systematic implementation of these strategies.
- Understand the features of mathematics HQIM (e.g., modules, topics, lessons, formative assessment) and how its coherent design helps tell a continuous story of mathematics for students year over year.
- Understand why HQIM matters and how it leads to more equitable outcomes for all students.

Coursework and clinical practices aligned to this competency:

- Aspiring educators are placed in field placements where HQIM is being used and is implemented skillfully.
- Aspiring educators engage in coursework that analyzes their state's mathematical standards and shifts aligned to their state context.
- Aspiring educators engage in coursework and assignments that support them in understanding how to use read and use HQIM to prepare for and facilitate lessons.
- Aspiring educators analyze HQIM in field placements and make connections between the material, state standards, and research based instructional strategies in mathematics.
- Aspiring educators analyze HQIM formative and summative assessments and make connections between modules, topics, and lessons to understand the depth and coherence of HQIM.

Competency 2: Aspiring educators can effectively plan for instruction utilizing HQIM.

What do aspiring educators need to know and be able to do?

- Navigate HQIM to identify learning goals for modules, topics, and lessons and how they connect to state standards and mathematics research-based practices.
- Understand the arc of learning across a year and how lessons within modules and topics build upon each other to support depth and coherence of mathematics content.
- Understand how formative assessments build from lesson to lesson, topic to topic, and lead to success on summative assessments and how to use data to address student misconceptions in future lessons.
- Plan for lessons and units by completing questions and activities students will complete and

identifying one's own gaps in understanding and plan to address them.
+ Anticipate student misunderstandings using formative assessment data and using curriculum embedded scaffolds and supports to support diverse learners to access Tier 1 math instruction.
+ Be able to appropriately customize lessons without undermining coherence and rigor of the materials to address diverse learner needs, time constraints and campus priorities.

Coursework and clinical practices aligned to this competency:

+ Aspiring educators have opportunities to engage in lesson study protocols to internalize HQIM modules and lessons rather than engaging in lesson and module design.
+ Aspiring educators have opportunities to engage with teacher mentors in planning for instruction utilizing HQIM both independently and in collaborative settings (e.g., PLCs).
+ EPPs faculty model for aspiring educators how to plan for instruction utilizing HQIM and are given opportunities to rehearse planning for instruction with HQIM alongside classmates and mentors.
+ Aspiring educators are evaluated and given feedback on their ability to plan to utilize HQIM.

Competency 3: Aspiring educators can effectively deliver instruction utilizing HQIM.

What do aspiring educators need to know and be able to do?

+ Effectively execute pedagogical activities described in the materials such as facilitating collaborative problem solving and discussion that enable students to carry the cognitive load to achieve the intended learning goals.
+ Identify essential instructional activities, tasks, and questions (to address time constraints and diverse learner needs) in lessons and prioritize these without undermining the coherence or rigor of materials.
+ Deliver the curriculum as designed; only making customizations in response to student misconceptions and diverse needs.
+ Utilize formative assessments during lessons to address misconceptions in both procedural and conceptual understanding.

Coursework and clinical practices aligned to this competency:

+ Aspiring educators can see models of expert educators planning and delivering instruction utilizing HQIM.
+ Aspiring educators observe and participate in collaborative HQIM internalization meetings where lesson rehearsal and customization take place.
+ Aspiring educators get multiple opportunities to deliver instruction utilizing HQIM.
+ Aspiring educators get multiple opportunities to respond to formative and summative assessments and make customizations and adjustments to lessons using data.
+ Aspiring educators receive feedback on their ability to execute HQIM lessons where students carry the cognitive load through the use of observation rubrics that measure a candidates ability to use HQIM skillfully.

Coursework and Clinical Practice Audit:

Use the following questions to determine if your program is supporting aspiring educators to use and skillfully implement HQIM.

1. **Where do you see alignment between your current coursework and the competencies?**

2. **Where do you see gaps between your current coursework and the competencies? Consider coursework that works against HQIM implementation best practices.**

3. **Which adjustments can you make to coursework immediately? Consider coursework that you may need to cut to allow for HQIM focused coursework.**

4. **Which adjustments will take time to integrate into coursework?**

Research

We considered the following research in developing these recommendations:

- CCSSO: HQIM Competencies and Coursework/Clinical Experience Standards, 2022
- Texas Education Agency's Research Based Instructional Strategies, 2021
- Innovations in Teacher Preparation: *Preparing Teachers for the Skillful Use of Curriculum*, Charles and Lynn Schusterman Family Foundation, 2022