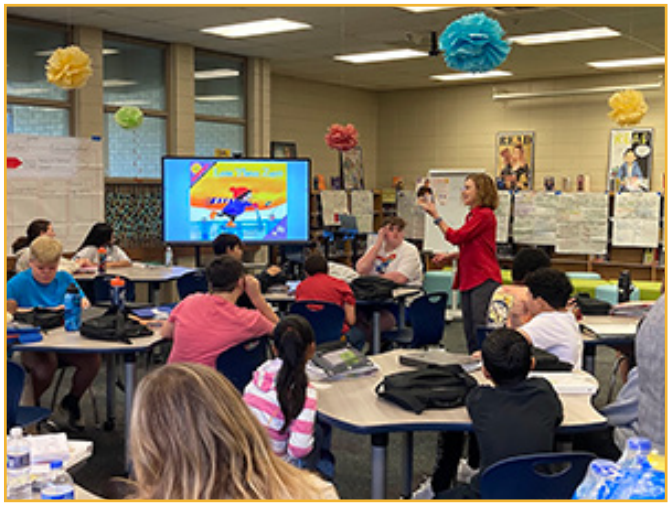
Building Math Success for Multilingual Learners in Alabama: Proven Strategies from Diverse Frameworks

by Jhina García-Snell—EL Regional Specialist, Alabama Department of Education

As a multilingual learner education coach in Alabama, I have learned of the importance of integrating content and language when supporting K-12 English learners. Integrating content and language has the potential to bring about a positive change, especially in a state where the population of English learners is growing, and the number of multilingual learners varies significantly between schools and districts. In particular, by consistently implementing math and language instructional strategies, we can facilitate a significant difference in learning outcomes for our English learners.



Lisa Meyer, AIM4S³™ Developer, models strategies that equip educators to provide access to grade-level math content and language for all students.

In Alabama, multilingual learners comprise nearly 4% of the state's student population (Alabama Framework for English Learner Success, Alabama State Department of Education). This means that there are one or two multilingual learners in most classrooms. All students participate in state assessments, and although multilingual learners recently showed improvement in our math state assessment, there is still a substantial performance gap between English learners and their native-speaking peers. After analyzing tests results, our goal became clear: we must be dedicated to implementing evidence-based instructional practices that foster language learning and academic success to support our multilingual learners.

María Franco, Multilingual Learner Administrator for the State of Alabama, has worked diligently to support the success of our students. As an English learner herself and a former science classroom teacher, she played a key role in designing the Alabama Framework for English Learner Success with a designated team. Additionally, she supervised the development of High-Quality Instruction and Assessment (HQIA) for English Learners with support from the Region 7 Comprehensive Center (R7CC). This promising tool seeks to provide Alabama educators with evidence-based instructional practices in order to increase academic achievement for MLs in the state (IES REL Southeast, 2023).

Under the guidance of Mrs. Franco, the state efforts to promote academic success for MLs began in 2023 with the implementation of Alabama's HQIA. First, instructional coaches familiarized themselves with best practices and then trained teachers on the key instructional components of the HQIA: asset-based instruction, student-centered engagement, academic discourse, scaffolding, and formative assessments.

After a successful learning journey with HQIA, we contracted with Dual Language Education of New Mexico in 2024 to be trained in Achievement Inspired Mathematics for Scaffolding Student Success (AIM4S³™), a tool that equips educators to provide access to grade-level math content and language for all students, with a particular focus on supporting multilingual learners. This framework consists of the following components in support of math success (AIM4S³™ Math Training Overview, 2024):

- ***Focus and Motivation*** – Encourages connections between students' prior knowledge and new concepts and builds relevancy and interest for students.
- ***Compendium*** – Provides a "big picture" of the unit, incorporating visuals, key vocabulary,

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student-friendly goals, and students' questions and experiences.

- ***Unit Lessons*** – Align with state standards while embedding scaffolding strategies into daily instruction.
- ***Closure and Goal Setting*** – Helps students reflect on their learning and set future goals.

The AIM4S3™ Framework training provided us with an incredible opportunity for collaboration between state math and multilingual education coaches. In addition to exploring mathematical principles and instructional strategies, we engaged in reflective practices based on modeled lessons that aligned with our HQIA for ELs and WIDA language development standards (wida.us). The components of the AIM4S³™ framework were essential in supporting our learning and the development of strategies to assist English learners (ELs).

The first component of AIM4S³™ is ***Focus and Motivation***. This component encourages students to connect their current understanding with new concepts, aligning with the HQIA asset-based learning approach. Both frameworks emphasize the importance of activating ELs' prior knowledge to help them understand new math concepts. HQIA particularly stresses the significance of incorporating students' cultural backgrounds into their learning experiences to facilitate the understanding of new concepts.

Questioning is also a fundamental aspect of the Focus and Motivation component. This practice allows students to develop their questioning skills. For example, students might be encouraged to ask questions like, 'How did you arrive at that answer?' or 'Can you explain your reasoning?' This dynamic not only helps MLs develop their questioning skill, but allows teachers to gain deeper insights into students' thought processes and approaches to arithmetic operations.

The Compendium, the second component of the AIM4S³™ framework, is a powerful community resource built with students that creates a reference that grounds student learning with visuals and key vocabulary and includes student inquiry and student-friendly standards and mathematical practices. When visuals are incorporated into accessible tools for multilingual learners, they significantly enhance all learning.

The building of the Compendium and its use by students as a resource not only helps students develop their language skills but also empowers them to take ownership of their own learning. This is a key aspect of HQIA's student-centered engagement indicator. Educators integrate language and literacy development across all disciplines, building on EL students' strengths and experiences while promoting autonomy and supporting student motivation for language learning in a variety of settings.

The Compendium also facilitates the integration of academic discourse. As students discuss and document their findings on the Compendium, sentence frames and word repetition support students in acquiring math-related language. Sheltering and scaffolding are Key Instructional Principles of the AIM4S³™ Framework that align with HQIA's Scaffolding Indicator. When lesson planning, it is necessary to consider each student's level of English proficiency, academic ability, and the language demands of the lesson. According to HQIA, educators should work within students' zones of proximal development, offering the appropriate level of support necessary for their advancement.

Scaffolding is flexible and can take diverse forms depending on students' learning experiences and language proficiency levels. Educators develop appropriate scaffolds over time, finding new and effective ways of supporting their students, particularly as they gain more experience in content and language teaching. By gradually removing scaffolds as students gain proficiency, teachers are able to promote productive struggle and encourage independence in students' learning processes.

In AIM4S³™, the component area of Closure and Goals Setting reflects HQIA's formative assessment indicator. It is designed to revisit learning and reinforce key math and language concepts as well as have students see themselves as active participants in the assessment and learning cycle. In the HQIA framework, students' goal setting plays a significant role in guiding content and language instruction,

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providing a clear teaching and learning path for educators and students.

The AIM4S^{3}™ training also led us to an important finding as our language and math coaches explored the Alabama Math Standards, which are based on the NAEP standards and NCTM math principles (*https://alabamastandards.org/0c01a9eb-4d20-4578-89fb-3876b435c3d4*). We discovered that it is possible to develop an approach to mathematics instruction focused on two key ideas: teaching mathematical principles and enhancing students' language skills. These principles will assist our departments in supporting teachers in establishing clear goals for mathematics and language learning.

As a WIDA state, Alabama follows the guidance provided by the WIDA standards framework. This framework emphasizes four key components, two of which educators can use when combining language instruction with content instruction: integrating content and language and a functional approach to language development that includes key language use and a language goal that provides the students the opportunity to practice and use key language. By merging mathematical principles with the WIDA key language uses, we created a tool to guide educators in developing powerful language goals for their multilingual learners. See the table below.

NCTM Mathematical Principle	WIDA Key Language Use	Language Goal
Establish mathematics goals to focus learning	Recount, Discuss	Students express their learning goals and discuss why these goals are important to help them concentrate their efforts.
Implement tasks that promote reasoning/problem-solving	Explain	Students express their problem-solving strategies and provide justification for their reasoning.
Use and connect mathematical representations	Recount, Explain	Students describe steps and explain relationships between different representations.
Facilitate meaningful mathematical discourse	Discuss	Students engage in collaborative discussions to share and refine their mathematical ideas.
Pose purposeful questions	Explain, Discuss	Students respond to purposeful questions to articulate their reasoning and interact with their teacher and peers.
Build procedural fluency from conceptual understanding	Recount, Explain	Students describe steps and explain relationships between different representations.
Support productive struggle	Argue, Discuss	Productive struggle fosters argumentation and dialogue to refine reasoning and solutions.
Elicit and use evidence of student thinking	Recount, Explain, Argue	Students recount their process, explain reasoning, or argue solutions to show understanding.

By providing a specific purpose for language in relation to each mathematical principle, our approach to teaching multilingual learners became more focused and intentional. While not all classroom language practices can be captured in a single approach, tools like this can serve as practical guides for weaving language into math instruction. Furthermore, such tools may spark innovative ideas to refine and strengthen strategies for teaching multilingual learners.

As educators, our mission extends beyond delivering content; we are shaping learners to think critically, solve problems, and communicate effectively. Integrating mathematical principles with purposeful language development equips English learners to overcome challenges, reach their academic potential, and thrive throughout their educational journeys.

Achieving this vision requires a collaborative and strategic effort to improve mathematics instruction for multilingual learners across our schools and states. By leveraging frameworks such as the Alabama Framework for English Learner Success, HQIA, AIM4S^{3}™, WIDA, and the NCTM mathematical principles, we can create meaningful connections between content and language instruction. This integration fosters an equitable learning environment, ensuring all students have the opportunity to excel academically.

Resources

Alabama Standards. (n.d.). Alabama Math Standards. Retrieved November 2024, from https://alabamastandards.org/0c01a9eb-4d20-4578-89fb-3876b435c3d4

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AIM4S³™ Trainer Perspective: Collaboration Across Departments at the State Level is Possible

For this AIM4S³™ math training in Alabama, Maria Franco brought together the multilingual learner and math coaches from various state-level departments.This is the first time at Dual Language Education of New Mexico that our math team has seen this type of collaboration at the state level. During the training, these two groups shared theory and best practices in math and language learning. They observed classroom demonstrations that put theory into action and worked collaboratively to plan and teach lessons together.

During our six days together, the coaches had deep conversations tapping the expertise of all participants. They increased their understanding of the power of conceptual learning in mathematics and the challenges teachers face when teaching this content. The math coaches took a closer look at the complexity of English and how targeted language development is key to developing students' math abilities. There also were some powerful conversations about how math can look different across the world. As an example, some of the language coaches shared their own experiences with division, noting that in some Latin American countries dividend and divisor are placed differently than in the U.S. standard division algorithm. Their point was that some students come with math knowledge that U.S. teachers don't recognize because the students' work differs from what teachers expect.

During the training, we often heard comments from the coaches about the need for ongoing collaboration between the departments in order to support teachers in delivering effective math instruction for multilingual learners in Alabama. This will be a challenge with the reality of day-to-day responsibilities and schedules, but we are excited to see how they continue to build bridges across their work. Content and language should not live in separate silos at our state departments when teachers need to be addressing both of these continually in their classrooms with students.

While Alabama may not have as large a concentration of multilingual learners as other states, they have developed powerful tools to guide their schools and districts in educating language learners. Many states with much higher numbers of English learners do not have cohesive frameworks that work across content and language to support the success of multilingual learners. These tools are well worth looking at by other states and organizations. Kudos to Alabama for the work they have done to increase the visibility of multilingual learners in their state.

Academic coaches from various state education departments particpated in DLeNM's AIMS4S³™ training.