Enhancing Math Education in Texas Through Blended Learning: A Closer Look at Math Innovation Zones

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Math Innovation Zones (MIZ) is a strategic grant initiative first introduced by the Texas Education Agency (TEA) in 2018. A novel state-initiative aimed at increasing PreK – 8th grade math proficiency, the highly competitive grant program provides funding to both Texas school districts and open enrollment charter schools using allocations through Rider 41, in the General Appropriations Act, to develop and foster student math skills using an innovative research-based blended learning model. TEA is responsible for oversight of the program, identifying and vetting curriculum providers, and providing an accountability system that requires stakeholders to demonstrate implementation fidelity.

Each year since inception, MIZ has provided funding for a cohort of Local Education Agencies (LEA) to pursue state MIZ designation through a four-year process of strategic planning, effective implementation, gradual scaling, and sustainable maintenance of the blended learning model. Aimed at promoting math achievement, the main objective of the initiative is to enhance student performance in math, particularly ensuring student readiness for 8th grade Algebra I which increases access to advanced STEM and CTE courses in high school, while promoting the capacity for long term program sustainability in school districts using a blended learning model.

What is Blended Learning?

Blended learning is an innovative pedagogical strategy which uses technology to enhance traditional face-to-face classroom teaching. Assessing students' prior knowledge, tailoring academic pathways for individual students, and adapting lessons based on mastery levels are just a few examples of how technology can be strategically employed within this educational framework. The focus of blended learning is on promoting data-driven instruction and facilitating student agency and ownership of the learning process. By creating Math Innovation Zones, TEA aims to increase student use of research-based math adaptive software which align to OER core math curriculum in tandem with high quality teacher instruction within the traditional classroom setting. These adaptive programs allow teachers to better understand individual student needs in math enabling them to provide instruction targeted to the student and skill level. Participating in MIZ promotes the creation of a high-quality math curriculum which caters to the unique needs of individual students.

> **Taking Algebra I in 8th grade increases access to advanced STEM and CTE courses**

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Why does Algebra I in 8th Grade Matter?

Algebra I is oftentimes considered a "gatekeeper" course since it serves as a co-requisite or pre-requisite to many high school math and science courses. Opting to take Algebra I during the 8th grade creates multiple entry points for STEM courses in early high school, enabling students to pursue more advanced science and math courses their junior and senior year. In the state of Texas, this progression also creates opportunities for students to take more advanced specialized CTE courses which are designed to equip students for entry into the workforce. When a student does not take Algebra I in 8th grade, it can limit the overall number of STEM courses they can enroll in before graduating high school (E3 Alliance, 2022; Kirksey et. al., 2023). MIZ aims to increase readiness for 8th grade Algebra I which increases access to high level STEM coursework for Texas students.
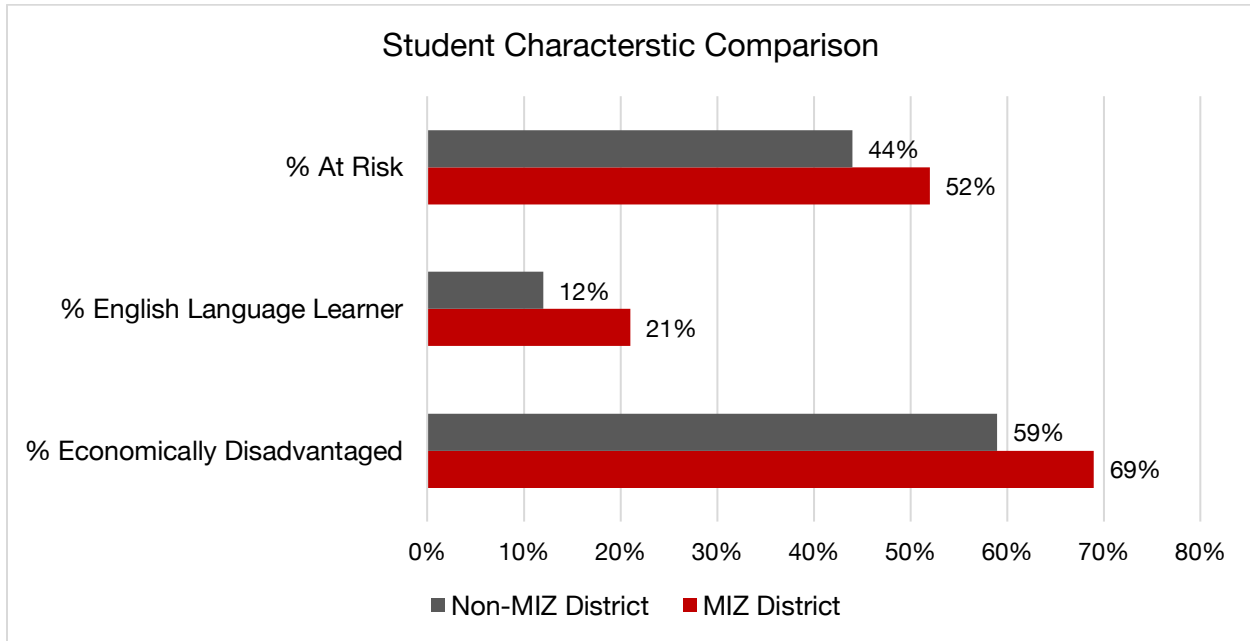
Policy Impact

We look descriptively at the distribution of Math Innovation Zone grant districts throughout the state of Texas from 2018-2023. Though grant participation data is gathered at a district level for this study, LEAs can choose the scale of implementation with many starting with a grade level pilot(s) with plans to increase implementation through years 2-4 of the grant cycle. This descriptive study focuses on grant distribution from a district level. In total, 98 MIZ grants have been awarded since 2018 with the sharpest increase of grant recipients occurring in 2023 (24).
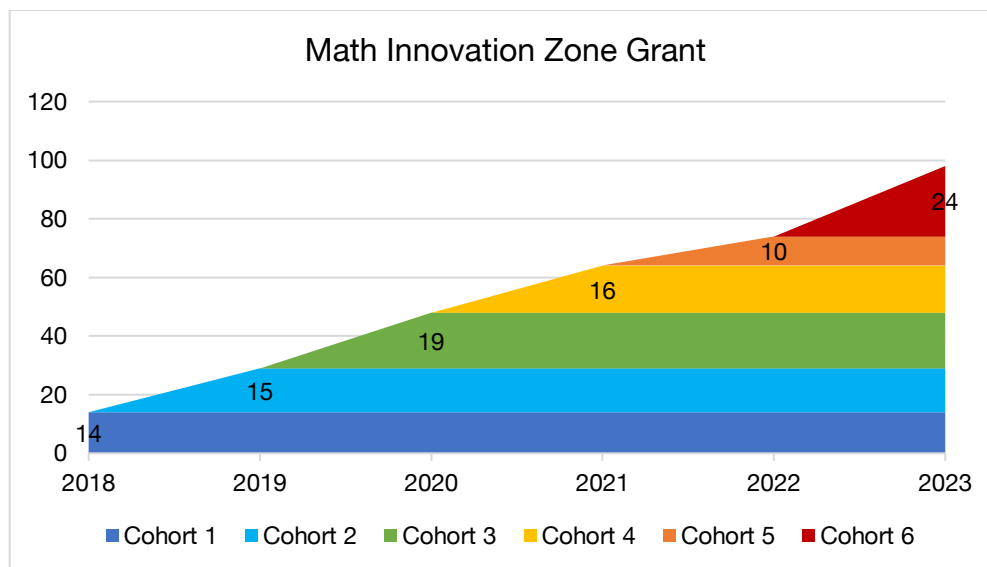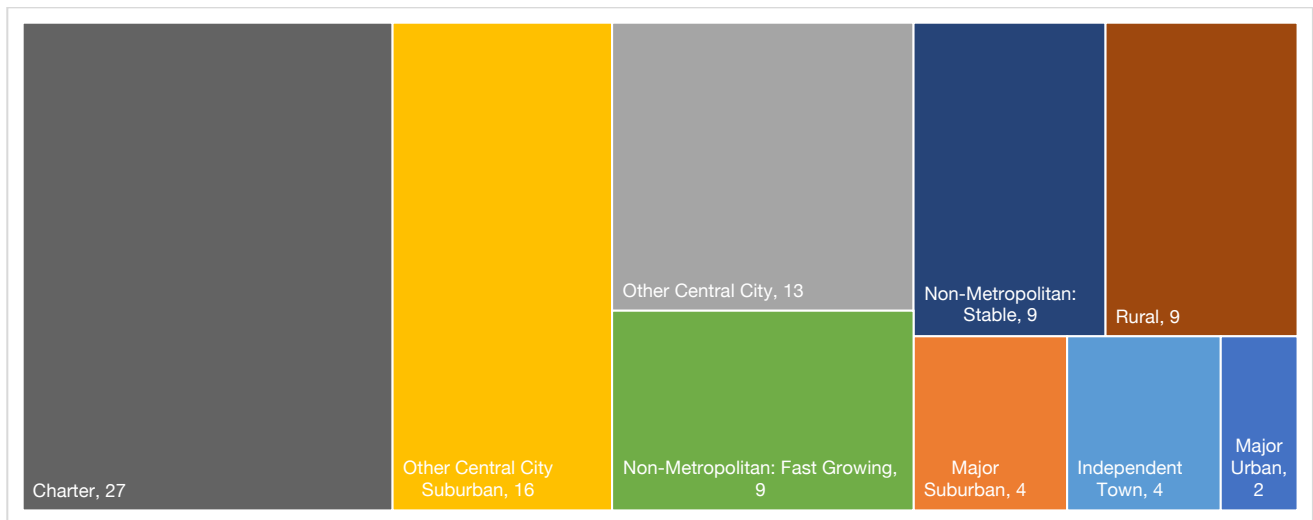

The grant cycle is competitive, meaning that districts must submit appropriate documentation to TEA concerning student characteristics, student need, and program intentions. After reviewing application, potential districts are sorted based on pre-determined characteristics. Student socioeconomic status is a key predictor of academic challenges (E3 Alliance, 2022; Kirksey et. al., 2023); as such, this student characteristic is heavily reviewed during the selection process.

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The graph below highlights key differences in student characteristics of MIZ districts and non-MIZ districts. MIZ districts tend to have a higher percentage of economically disadvantaged students (69% compared to 59%) and a higher percentage of English Language Learner students (21% compared to 12%). Incidentally, the percentage of students considered to be at-risk for dropping out of school, as determined using state-defined criteria, is also greater in MIZ districts (52% compared to 44%). Each comparison confirms district selection based on greatest student academic need.

Student Characterstic Comparison

Category	Non-MIZ District	MIZ District
% At Risk	44%	52%
% English Language Learner	12%	21%
% Economically Disadvantaged	59%	69%

■ Non-MIZ District ■ MIZ District

TEA categorizes districts into nine classifications, considering factors such as enrollment, population, and urban proximity. MIZ grants have been successfully distributed across all nine categories with a higher number of charter school districts (27) securing grant funds as compared to other classifications. Notably, most participating campuses are designated as Title I which helps bridge the educational opportunity gap by implementing blended learning strategies in high need schools.

- Charter, 27
- Other Central City Suburban, 16
- Other Central City, 13
- Non-Metropolitan: Fast Growing, 9
- Non-Metropolitan: Stable, 9
- Rural, 9
- Major Suburban, 4
- Independent Town, 4
- Major Urban, 2

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The MIZ grant distribution spans the entirety of Texas encompassing a variety of districts throughout the state. It is important to recognize that districts with a small geographical footprint, particularly charter school districts, may not be readily discernible within this visual representation which shows this distribution.
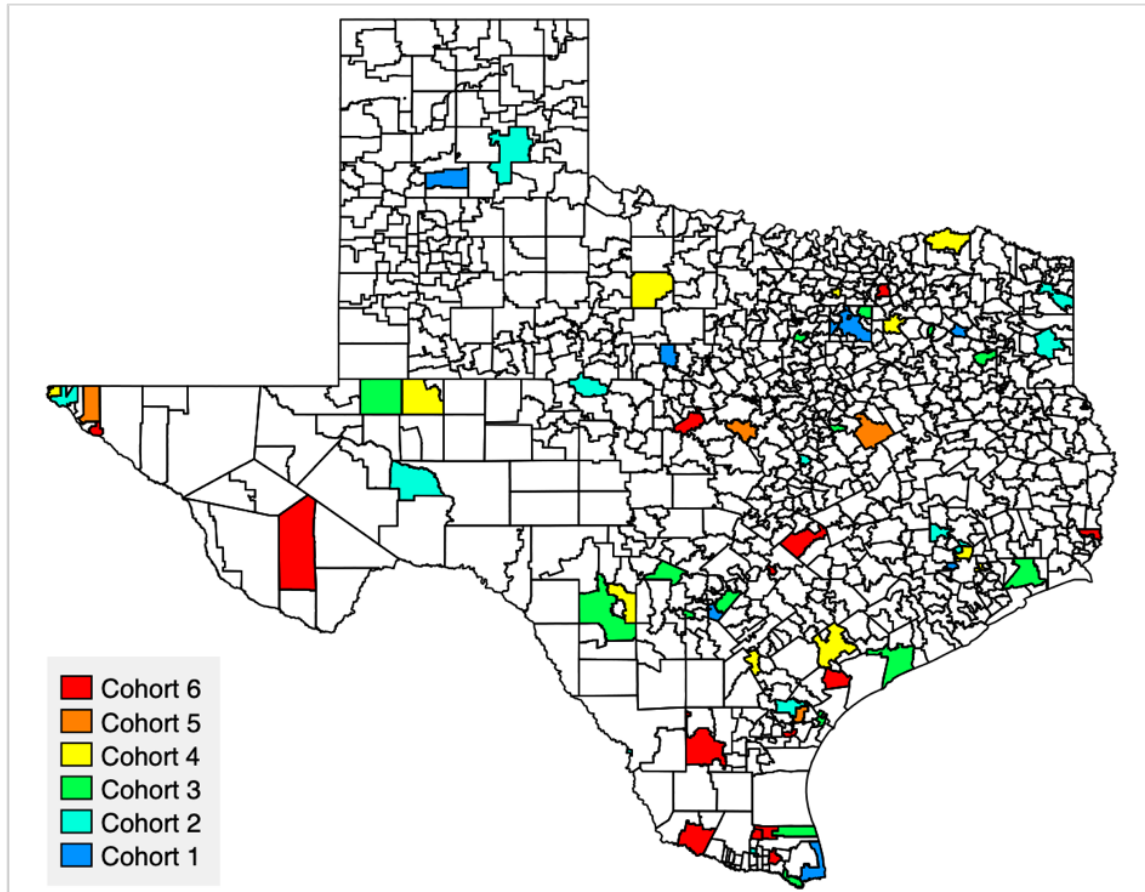
Conclusion

The 2018 implementation of Math Innovations Zones with a focus on blended learning in Texas aimed to increase 8th grade Algebra I readiness. Through the strategic use of software embedded within math curriculum that identifies math understanding, teachers can personalize student learning according to each student's skill level. Taking Algebra I in 8th grade significantly improves access to higher level math, science, and CTE coursework in high school. Within this brief, we outlined the primary objectives of the grant and focused on the distribution of grant recipients, considering student characteristics, TEA district type and geographic location. Student characteristics of districts that were awarded the grant were compared to districts that did not receive the grant. Districts receiving the grant had a higher percentage of students considered economically disadvantaged. Districts receiving the grant also had a higher percentage of English Language Learners and students that are considered at-risk for not graduating high school as compared to districts that did

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not receive the grant. This aligns with the Texas Education Agency's commitment to awarding strategic grants to high-need districts, especially those with a greater percentage of economically disadvantaged students. Grants were awarded across all nine classifications of TEA districts, highlighting their comprehensive reach for all students in addition to geographic distribution across the state. Future research will include a comprehensive analysis of data collected from each cohort complemented by an examination of student outcomes at the campus level.

Methodology

We use data from the University of Houston's Education Research Center (UH-ERC) which contains information for all students, teachers, schools, and districts in the state of Texas. This study is limited to 2018 through 2023. Using publicly available information from TEA, districts which received the MIZ grant were identified by district.

Research Team Bio

Kristin E. Mansell, Ph.D., is an Assistant Professor of Practice in Curriculum and Instruction at Texas Tech University. Her research is broadly focused on STEM education policy, the teacher workforce, increasing teacher efficacy through targeted professional learning communities, and the impact of blended learning and personalized learning on both student outcomes and teacher retention.

Heather Greenhalgh-Spencer, Ph.D., is an Associate Dean in the TTU Graduate School and an Associate Professor in Curriculum and Instruction. Her research emerges at the intersection of Educational Technology, Pedagogical Innovation, Personalized Learning, Engagement, and Global uses of Technology in STEM. Greenhalgh-Spencer explores practices of using technology and pedagogical innovation to create engaged learning in both formal and informal learning spaces, and in both national and global contexts. She explores issues in the STEM pipeline, and researches embodied and transdisciplinary learning practices that increase engagement for all populations in STEM courses. Greenhalgh-Spencer also researches blended / personalized learning (BL/PL) and the ways that BL/PL can create diverse pathways and increased opportunities for all students. This has, most recently, translated into an increased focus on teacher retention and student support in areas where teacher turnover is an issue.

References

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