Ensuring Achievement for All Students

NMSU STEM GRANTS and IMPACT IN THE CLASSROOM FOR ELL'S

CONTEXT FOR OUR WORK

- BORDER REGION IN SOUTHERN NM
- HISPANIC MAJORITY POPOULATION
- BILINGUAL STATE

- Collaborative Research Grants funded through NSF

Successful K-12 STEM Education: Identifying Effective Approaches in Science, Technology, Engineering, and Mathematics

- **Goal 1: Expand the number of students who ultimately pursue advanced degrees and careers in STEM fields and broaden the participation of women and minorities in those fields.**

- **Goal 2: Increase STEM literacy for all students, including those who do not pursue STEM-related careers or additional study in disciplines.**

We are focusing on outcomes and STEM practices, building the knowledge and pedagogical content knowledge needed for highly effective teaching and schools with a culture and focus on supporting students' learning

Gadsden Mathematics Initiative

- Context
- Local Systemic Change Grant
- Partnership Between NMSU and the District to improve mathematics teaching and learning
- After 5 years the district made significant progress in providing skillful effective mathematics teaching

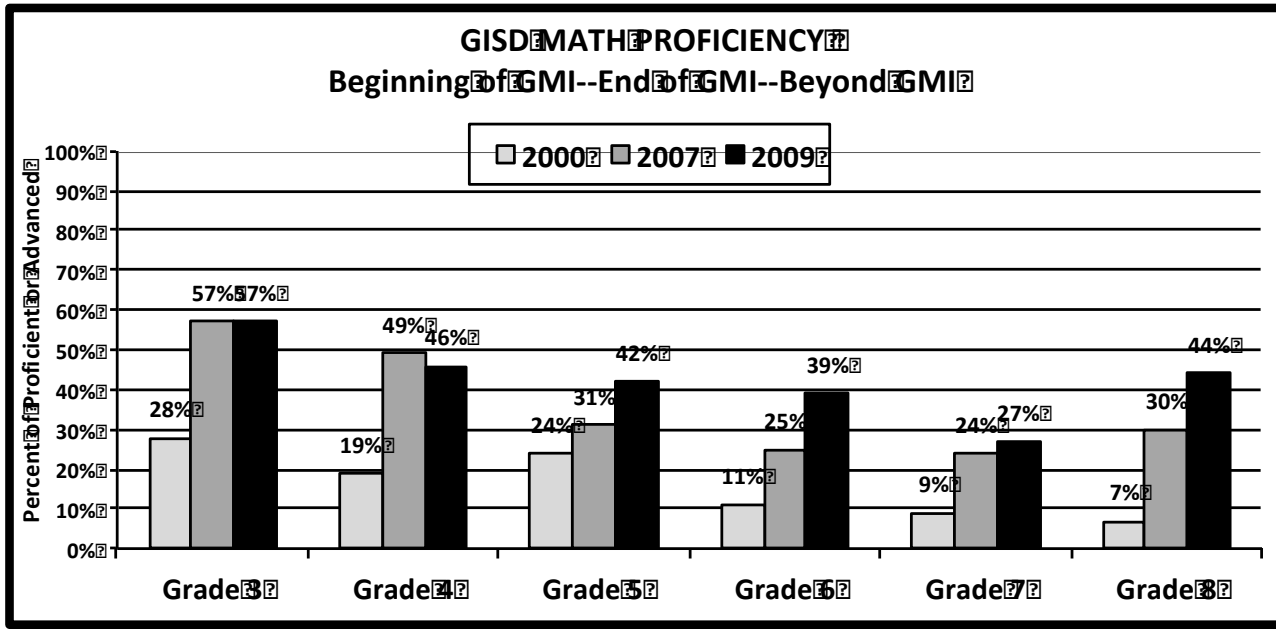
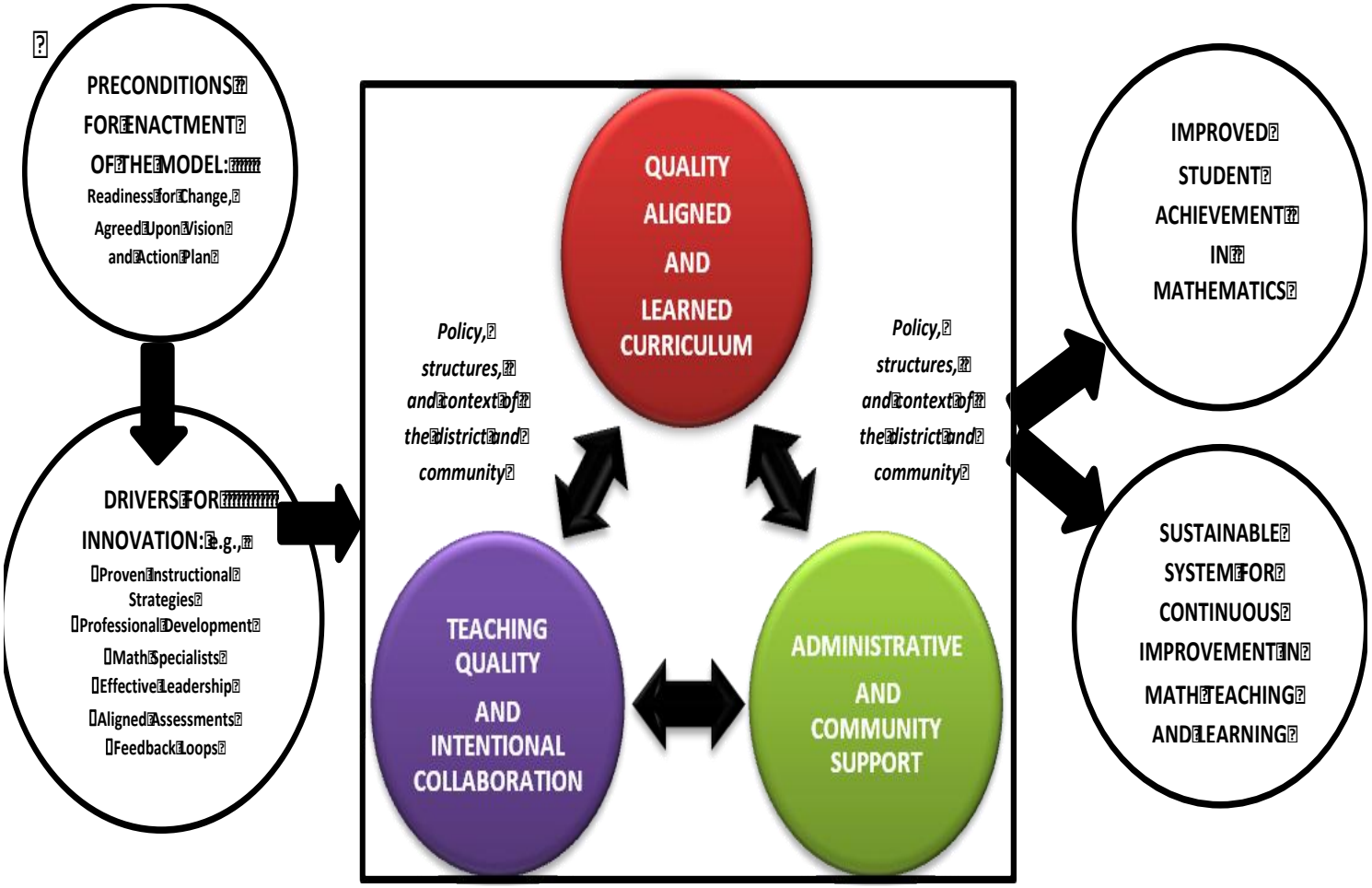


Table 1 shows the higher GISD proficiency rates for ELL students in the district in 2009, compared to other ELL students in the state. The GISD proficiency levels for ELL students surpassed the state average in all Grades 3-8.

Table 1: Comparison of the Mathematics Proficiency Rates on the 2009 NMSBA for ELL Students in Gadsden ISD and for ELL Students in the State

ELL Student Proficiency	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
District Average	76%	66%	59%	56%	45%	66%
New Mexico Average	47%	63%	48%	48%	36%	34%

Scaling up Mathematics Achievement



Leadership Institute for Teachers

- The LIFT project includes two cohorts; each cohort consists of 30 mathematics teacher leaders who will, by the end of the two year program, have a deep conceptual understanding of K-12 mathematics as well as the knowledge, skills, and dispositions to facilitate growth in mathematics teaching and learning environments. The central goals of the program are to:

- Increase Teacher Leaders' Knowledge of K-12 Mathematics;
- Expand and Enrich Pedagogical Practices;
- Develop Intellectual Leaders;
- Implement LIFT Learning in School Environments; and
- Sustain Teaching, Learning, and Research Partnerships between Mathematicians, Education Faculty, and School Districts.

Connecting Research and Practice-Supporting ELL's

- Mathematics instruction for ELLs should address mathematical discourse and academic language. This instruction involves much more than vocabulary lessons.

- Regular and active participation in the classroom—not only reading and listening but also discussing, explaining, writing, representing, and presenting—is critical to the success of ELLs in mathematics.

- Instruction should include a focus on "mathematical discourse" and "academic language" because these are important for ELLs. Although it is critical that students who are learning English have opportunities to communicate mathematically, this is not primarily a matter of learning vocabulary. Students learn to participate in mathematical reasoning, not by learning vocabulary, but by making conjectures, presenting explanations, and/or constructing arguments

Common Core standards: application of standards for English Language Learners

Authentic Interaction

- Mathematical Task

Teacher

- Behind the scenes – Activating prior knowledge
- Setting the stage for Risk-Taking
- Facilitation – Purposeful, structured Authentic Interaction

Students – In their Voice

- Constructing Arguments
- Defending rationale
- Making conjectures and Discourse based on Mathematical Reasoning

- Video Clip

Math Task Protocol

- Take about **45 seconds** to read your task.
- **Individually** - Take **two minutes** to work on the task. Use words, pictures, or numbers to solve the problem
- **Partners/Whole Group** – Take **four minutes** to share your strategies and ideas
- **Agree on a Summarizer** who will be responsible for sharing your observations or learning with the whole group

Constructing Viable Arguments

- Mathematical Task

Teacher

- Behind the scenes
- Setting the stage for Risk-Taking
- Facilitation – Purposeful Authentic Interaction

Students – In their Voice

- Constructing Arguments
- Making conjectures and Discourse based on Mathematical Reasoning

- Video Clip

Math Task Protocol

- Take about **two minutes** to read one or two of the pages in your handout.
- **Individually** - Take **two minutes** to write a brief reflection on the students' work and explanation of their approach.
- **Partners/Whole Group** – Take **four minutes** to share your reflections with your groups
- **Agree on a Summarizer** who will be responsible for sharing your observations or learning with the whole group

Construct viable arguments and critique the reasoning of others

Review Student Work

Language and Culture:

- Asset or Deficit?
- Fostering language rich environments
- Acquiring language and learning robust content simultaneously
- Empowering and advocating for student voices

Connecting Research to Practice - Discussion

1. School leadership as the driver for change. Principals must be strategic, focused on instruction, and inclusive of others in the leadership work.

2. Professional capacity or the quality of the faculty and staff recruited to the school, their base beliefs and values about change, the quality of ongoing professional development, and the capacity of a staff to work together.

3. Parent-community ties that involve active outreach to make school a welcoming place for parents, engage them in supporting their children's academic success, and strengthen connections to other local institutions.

4. Student-centered learning climate. Such a climate is safe, welcoming, stimulating and nurturing environment focused on learning for all students.

5. Instructional guidance that is focused on the organization of the curriculum, the nature of academic demand or challenges it poses, and the tools teachers have to advance learning (such as instructional materials).

Conclusion

- For all students to be successful in the STEM fields, teachers must be cognizant and understand the value of student:
  - Context
  - Culture
  - Voice
  - Language
- Impact on Student Learning
- Evidence of Student Learning

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