Addressing the Opportunity Gap in Science Education

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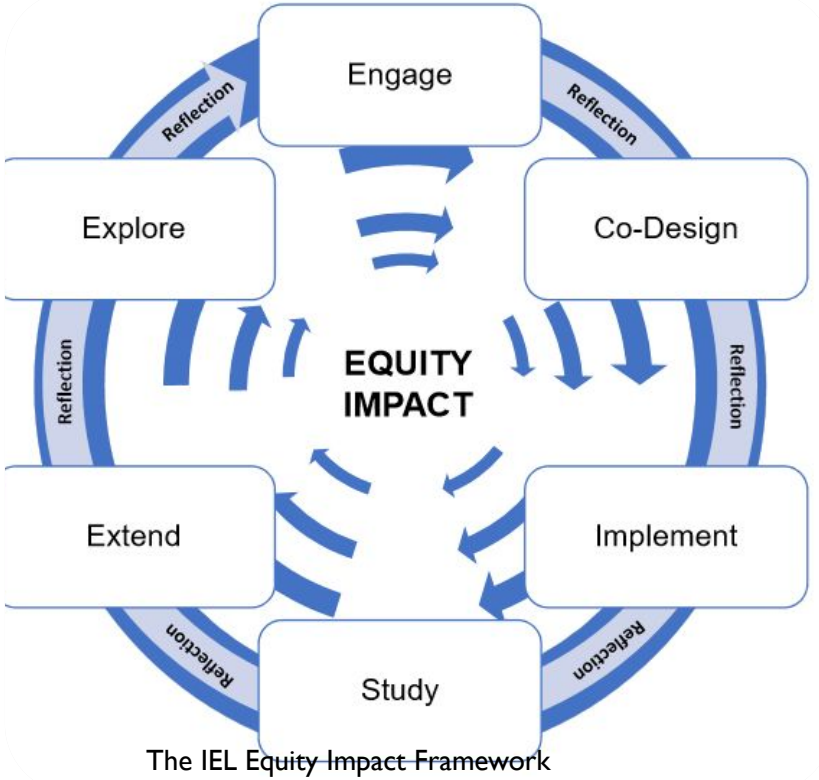
2024 EFEP Policy Project
Sara Lewis, M.Ed.



The IEL Equity Impact Framework

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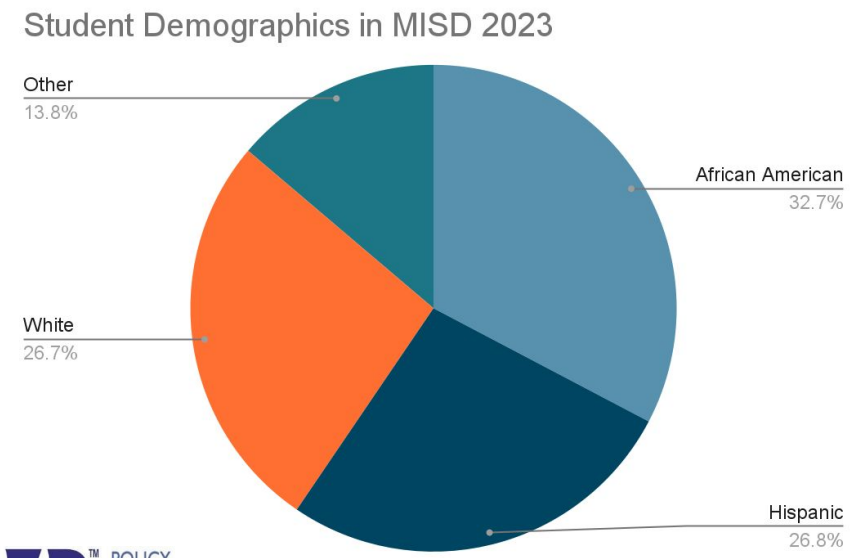
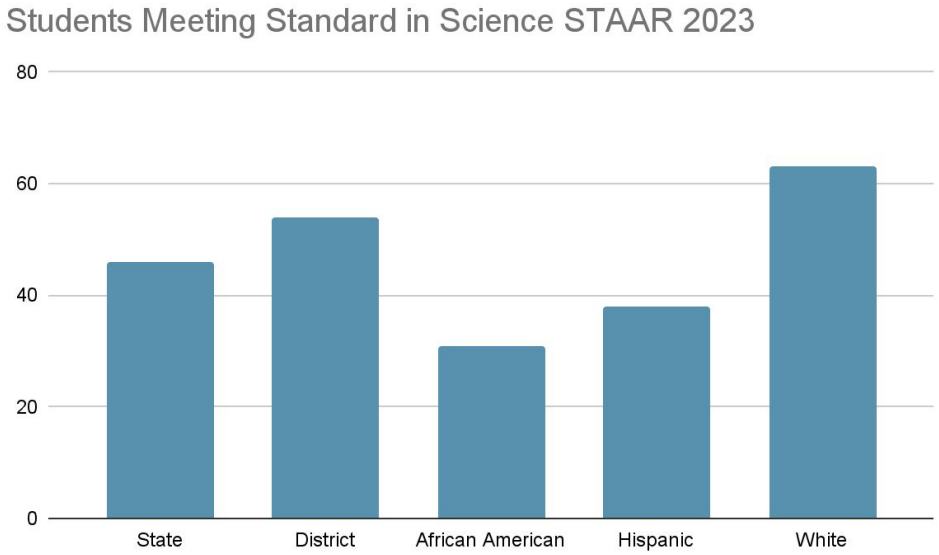
Exploring the Opportunity Gap in Science Education

- **Explore**: STAAR data; Reflection on personal experience as an educator, campus leader, and instructional coach; Interviews with current science educators and campus and district leaders; Identified areas of concern including a lack of teacher content knowledge and limited understanding of inquiry-based instructional practices





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Engaging the Literature on Science Education

- According to the National Education Standards (1996, p. 23): “Scientific inquiry refers to the diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work. Inquiry also refers to the activities of students in which they develop knowledge and understanding of scientific ideas, as well as an understanding of how scientist study the natural world”
- In order for a lesson or activity to be considered inquiry-based the learners must be engaged in scientific questioning, using evidence, forming explanations from that evidence, critically evaluating their explanations, and communicating and supporting their explanations (National Research Council, 1996)
- Populations that would benefit most from this type of instruction, minority and low socioeconomic students, are least likely to be educated through hands-on, inquiry-based methods (Samuels, 2014)

Engaging the Policy on Science Education

- **State Policy:** TAC §231 allows for teachers with a generalist certification to teach 6-8 grade science courses.
- **State Policy:** TAC §232.11 Classroom Teacher: 150 CPE hours required CPE requirements for a teacher shall be related to the certificate(s) being renewed and focus on the standards required for issuance of the certificate(s), including: • content area knowledge and skills; and • professional ethics and standards of conduct.
- **State Policy:** TEKS Chapter §112.26.b(1) Science: The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models.
- **State Policy**: Assessment: Science STAAR in fifth grade covers TEKS from third, fourth, and fifth grades; Science STAAR in eighth grade covers TEKS from sixth, seventh, and eighth grades

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Engaging the Policy on Science Education

- **Local Policy:** DEAB(Local) MISD professional employees supporting curriculum, instruction, and assessment must earn twelve (12) hours of SDCE credit annually. Teachers shall earn a minimum of six (6) hours of content training specific to the teacher's academic assignment.
- **Local Policy:** EH(Local)
  - District Administrators Shall: Provide District-wide professional development needed to implement the curriculum; Provide support for campus-level administrators in monitoring the implementation of the curriculum;
  - Campus Administrators shall: Develop a working knowledge of the curriculum content for all subjects/courses to effectively monitor delivery of the curriculum; Monitor using: Teacher appraisal observation and conferences; Frequent walk-through and follow-up conversations, including targeted best practice observations; and Periodic review of lesson plans and curriculum documents;
  - Teachers Shall: Align instruction to the district curriculum; Seek and actively participate in appropriate and ongoing professional development;
- **Local Policy:** Grade level splits are not ideal for success in science: Elementary PK-4, Intermediate 5-6, Middle 7-8

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Designing an Intervention

- **Co-Design**: Discussion with educators, curriculum and instruction department, campus and district leaders, and board members; Determined that the first steps would be to address issues with implementation and accountability related to current policies in order to affect change now; Future hopes to discuss revisions to policy
  - More readily available professional development for educators addressing science content and inquiry-based instruction
  - Professional development for campus administrators in identifying and evaluating effective science instruction

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Implementing the Intervention

- **Implement**: Provide science content and inquiry-based instruction professional development; develop administrator checklist to identify appropriate instruction in science
  - Developed virtual, self-paced courses for upcoming units that provided a review of the science content, vertical alignment, and suggested inquiry activities for the unit. Provided an exemplar inquiry lesson with a video of the lesson implementation.
  - Provided coaching support for questions and planning and implementation of inquiry lessons
  - Created a "Science Look-Fors: document to address what administrators should look for in an inquiry-based science lesson
  - Provided training to campus administrators on the Look-For document and science expectations

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Evaluating the Intervention and Next Steps

- **Study**: Further discussions with teachers and administrators for feedback on the interventions and suggestions for improvement; Discuss future policy recommendations to address remaining issues
  - Local policy should be amended to add specificity on what qualifies as content specific training for SDCE hours, how administrators should be reviewing and approving those hours, and what types of science specific required trainings should be provided by the district
  - State policy should address a lack of review and accountability for certificate renewal hours; Requirements for certification needed to teach science courses should be reviewed and updated
  - State policy should also consider the efficacy of a three-year assessment at fifth and eighth grade

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