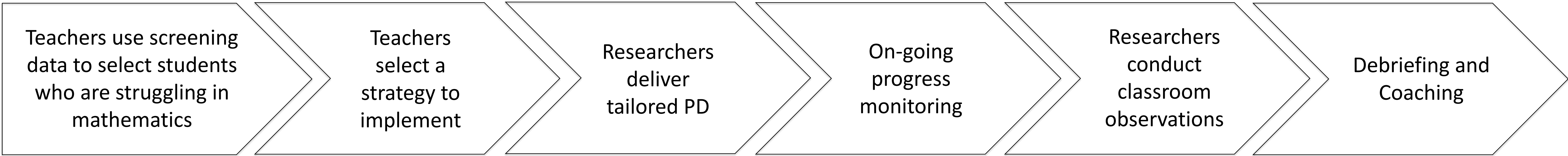# Data-Based Individualization in an Algebraic Readiness Systematic Framework

Erica N. Mason, Stacy M. Hirt, Elizabeth Tipton, & Tiffini Pruitt-Britton
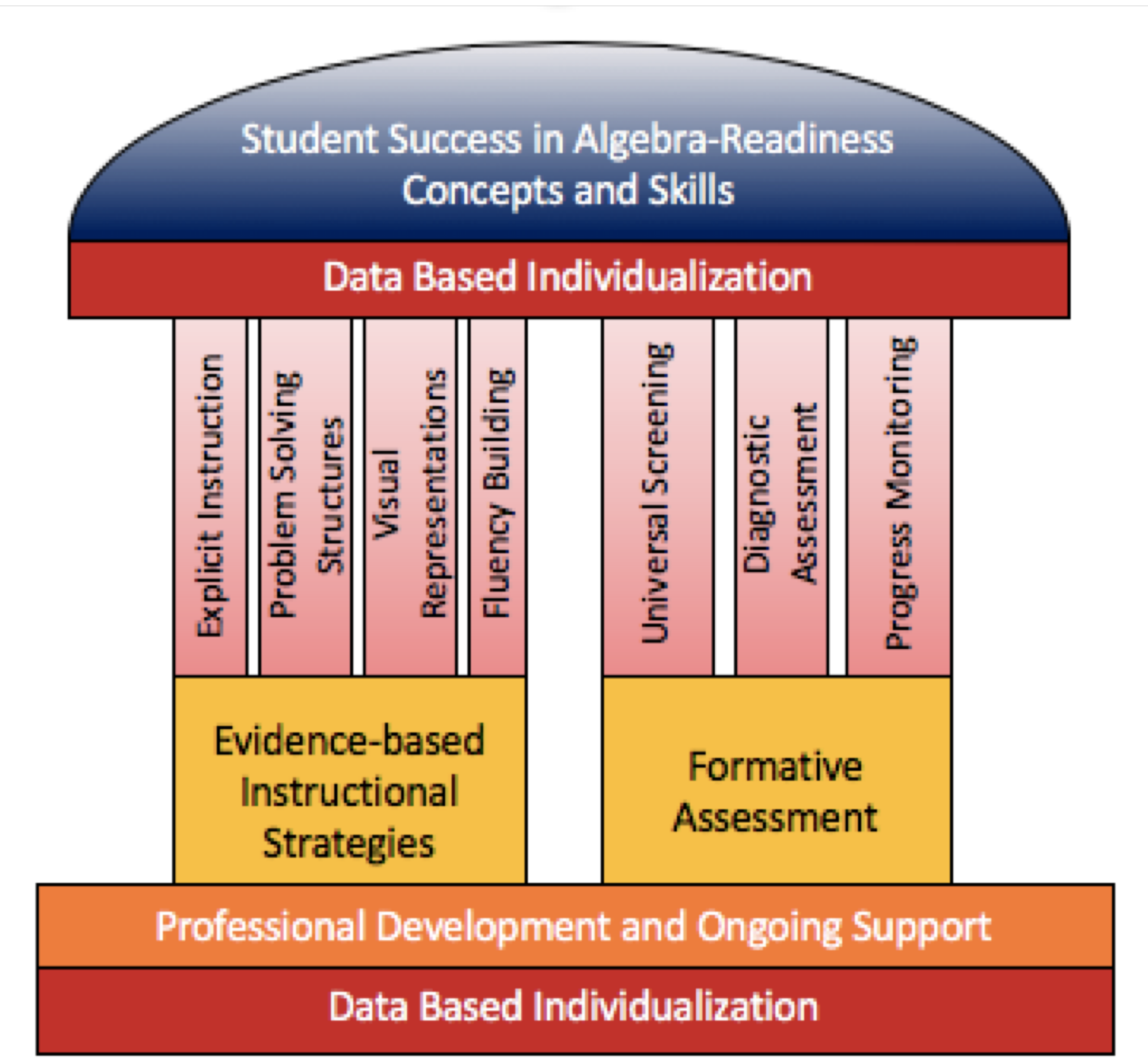
Project STAIR

Project STAIR is a model demonstrating the effectiveness of a system of instructional practices for supporting the algebra-readiness of middle school students at-risk for and identified with specific learning disabilities in mathematics.

Teachers use screening data to select students who are struggling in mathematics → Teachers select a strategy to implement → Researchers deliver tailored PD → On-going progress monitoring → Researchers conduct classroom observations → Debriefing and Coaching

Two schools in Missouri: one mid-sized suburban, one mid-sized urban ● General education teachers ($n = 13$) ● $6^{th} - 8^{th}$ grade students with and without IEPs ($n = 35$)

Primary Research Question

What is the impact of DBI and assessments on instructional practices for supporting the algebra-readiness of middle school students (i.e., 6th, 7th, 8th) at-risk and identified with specific learning disabilities in mathematics?

Student Success in Algebra-Readiness Concepts and Skills
Data Based Individualization

Explicit Instruction | Problem Solving Structures | Visual Representations | Fluency Building | Universal Screening | Diagnostic Assessment | Progress Monitoring

Evidence-based Instructional Strategies | Formative Assessment

Professional Development and Ongoing Support
Data Based Individualization

Key Components

- Three day-long professional development sessions
- Bi-monthly face-to-face coaching
- Bi-monthly virtual coaching (e.g., Zoom)
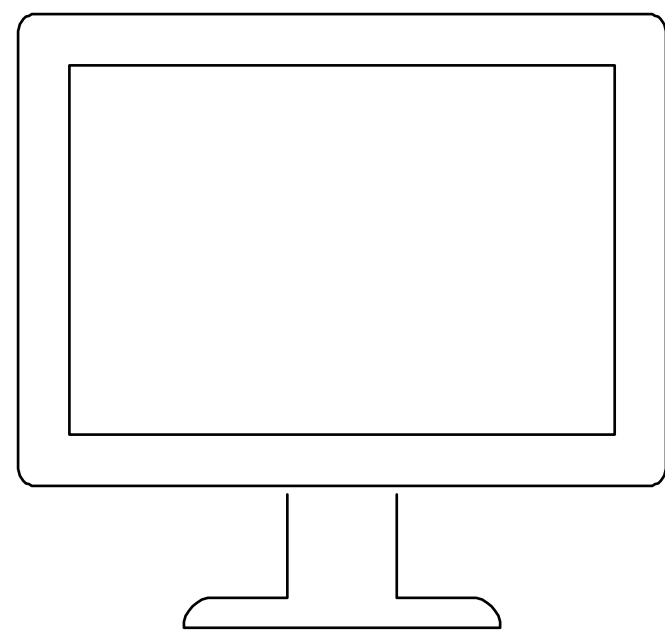- Classroom observations

Implementation Barriers → Possible Solutions
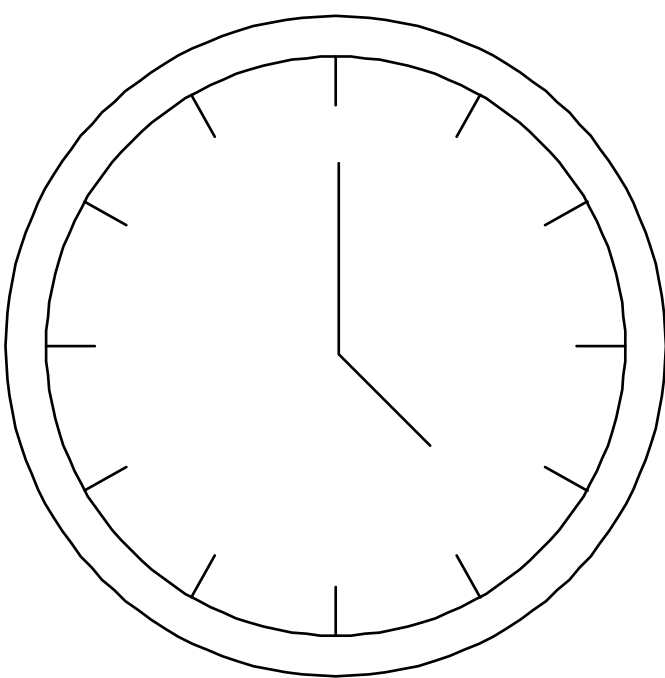
- Pre-test screening = 2 total hours
- Students experienced fatigue
- Required multiple trips to the school

→
- Plan for a longer pre-testing window
- Consider assessments more conducive to the time allotted

- Online CBM platform had multiple bugs
- Teachers invested time troubleshooting
- CBM data collection was affected

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- Consider non-electronic options for all CBM delivery
- Plan for a backup system of CBM data collection if an online platform experiences difficulties
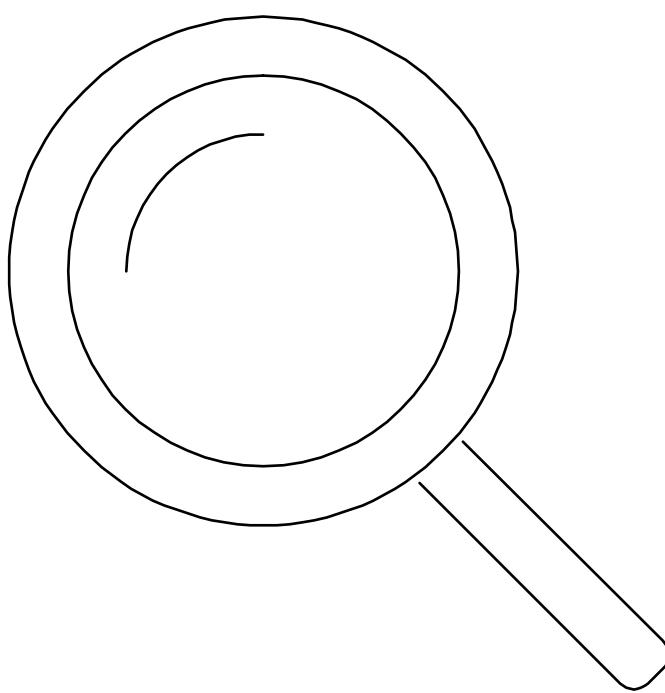
- Classroom observation form had 32 items
- Items in two categories were rarely observed (*see below*)

→
- Include strategy-specific sections aligned with study
- Consider narrowing items
- Reexamine the purpose of observation (e.g., what teachers are currently doing v. what we want them to be doing)

INSTRUCTIONAL DELIVERY	1	2	3	4	n/a	NOTES
Demonstrations are clear and concise.	☐	☐	☐	☐		
Teacher explanations are in-depth, but not excessive.	☐	☐	☐	☐		
Pacing of instruction is high, but accessible.	☐	☐	☐	☐		
Provides academic pre-corrects. *(anticipates student misconceptions, provides examples/explanations)*	☐	☐	☐			
Uses contextualized problems.	☐	☐	☐	☐		
Uses clear modeling.	☐	☐	☐	☐		
Uses guided practice.	☐	☐	☐	☐		
Incorporates visual representations. *(e.g., CRA model)*	☐	☐	☐	☐		
Uses planned examples.	☐	☐	☐	☐		
Students have an opportunity for independent practice.	☐	☐	☐	☐		
Content emphasizes conceptual understanding. *(procedural fluency can be present, but not emphasized)*	☐	☐	☐	☐		

INSTRUCTIONAL PRACTICES	1	2	3	4	n/a	NOTES
Uses data to drive instruction. *(references assessment data or outcomes of student learning as it relates to instruction)*	☐	☐	☐	☐		
Opportunity to develop fact fluency. *(should take no more than 10 minutes; emphasis on accuracy and efficiency, not speed)*	☐	☐	☐	☐		
Teacher promotes multiple strategies for solving problems.	☐	☐	☐	☐		
Teacher utilizes evidence-based mathematical practices.	☐	☐	☐	☐		

Classroom observation form adapted from Ketterlin-Geller (2014), Powell (n.d.), and Ratings of Classroom Management and Instructional Support (2009–2010). Form was pilot tested in spring 2018, before the beginning of the study.

Next Steps: Refine the model, analyze Year 1 teacher and student data, plan for RCT next year in four middle schools across two states