

An Analysis of Currently Available Professional Development Programs that Support Mathematics for English Language Learners



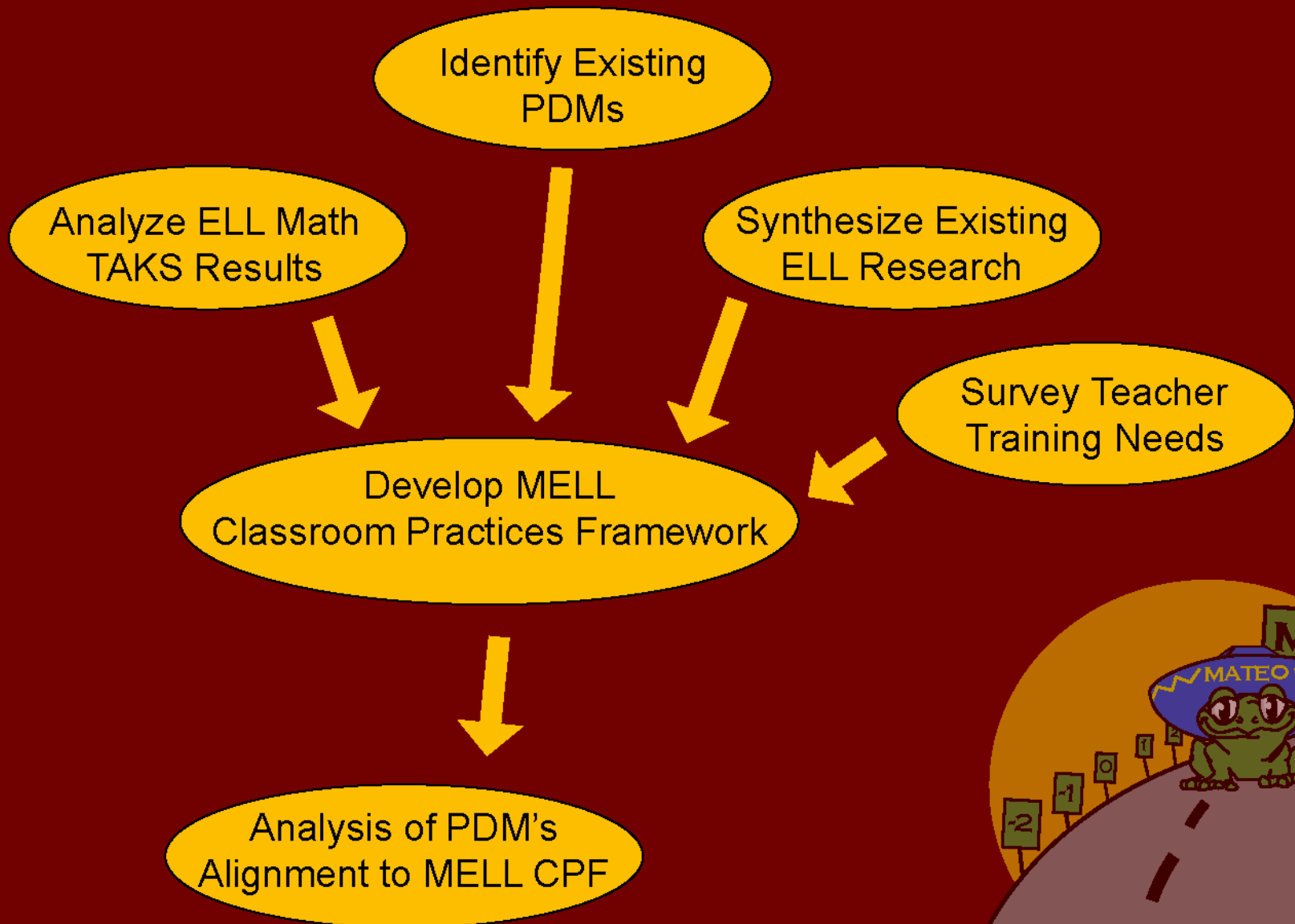
TEXAS
STATE
UNIVERSITY
SAN MARCOS

Presenter: Joyce Fischer

¿Background?

TSUS MELL

Texas State University System
Mathematics for English
Language Learners



Background

Topics to Cover

- Identified PDMs
- PDM Overviews
- PDM Summaries
- PDM Analysis



Models Identified

- Cognitively Guided I.
- Connect Math Project
- Everyday Math
- Family Math
- Figure This!
- Investigations
- MATHCOUNTS
- Mathworks
- Navigations
- Sharon Wells Math
- Sheltered Instruction
- Textteams

An Analysis Matrix of Professional Development Models Used in Texas

Name	Cognitively Guided Instruction (CGI)	Connected Mathematics Project (CMP)	Everyday Math (EDM)	Family Math (Equals)	Figure This!	Investigations
Developer and Year	Wisconsin Center for Education Research, University of Wisconsin 1996- Method to construct conceptual maps of children's thinking 1999-CGI PDM established	Michigan State University 1997- CMP I 2005-CMP II	University of Chicago School Mathematics Project 1983-1st Edition 2004-2nd Edition	Housed at EQUALS Center, University of California-Berkeley 1970's- Began as a way to get girls interested in math; later expanded to include all students	Joint project by NCTM, National Action Council for Minorities in Engineering, and Widmeyer Communications; Administered by 13-member advisory board 2001	Technical Educational Research Center-Curriculum and Math Ed specialists, Cambridge, Massachusetts 1990-1998-Curriculum field-tested 1997- Workshops
Grade Level	K-3	6-8	K-6	Pre K-12	Middle School	K-5
Training and Cost	Institutes & Consultation available from various sources- Prices start at \$350 per person for a half day; Wisconsin Institutes ended with grant in 2005	63-page implementation guide-\$8.97, Teacher's guide package-\$167.97, Student Edition-\$60.97 per book	6-week online modules (3 available)-\$90 per person per module National User Conference-\$171 per one day workshop Onsite workshop-cost varies	2-day workshops train educators and community members to lead classes for families-\$375 for 1 person or \$700 for teams of 2	Introductory materials on Figure This! website-all materials are free	Workshops-\$475-\$625; Additional professional development-suggestions in the curriculum materials

An Analysis Matrix of Professional Development Models Used in Texas

Name	CGI	CMP	EDM	Family Math	Figure This!	Investigations
Use	2 School Districts in Texas, others in the U.S. and worldwide	2,500 School Districts in the U.S.	175,000 Classrooms; 2.8 million students	34 States and 7 countries other than the U.S.	This is a free online program, so information about the number of users is not available	12,000 Teachers have participated in workshops
Curriculum and Content	Designed for professional development; Not based on a particular curriculum; Focuses on teachers' understanding of student thinking	Standards-based; 5 mathematical strands-complies with 2000 NCTM Standards	Linked to BRIDGES; Aligned with NCTM standards; 8 mathematical strands-broadens scope of school mathematics	Addresses NCTM Standards and California State Content Standards; Topics connect to school curriculum	Addresses grades 6-8 NCTM Standards	Mathematics program that includes numbers and arithmetic, geometry, data, measurement, and algebraic thinking

An Analysis Matrix of Professional Development Models Used in Texas

Name	CGI	CMP	EDM	Family Math	Figure This!	Investigations
Method	Story problem posing and problem solving are the foci of mathematics classes	Discovery based learning; Group activities; Connections between math strands and other disciplines	Real-life problem solving; Balanced Instruction; Communication about mathematics; Multiple methods of basic skills practice; Appropriate use of technology	Families learning math together; Problem-solving skills; Conceptual understanding using familiar materials	80 math challenges that address one or more NCTM Standards, students do challenges at home with their families	Exploration of central topics of a unit through investigations; Active engagement in mathematical reasoning
Applications to ELL	The model does not specifically address ELL, however, Walter Secada has performed research on applying CGI to the ELL classroom	Spanish student editions, ancillaries, and assessments available; Teacher's guide includes "Tips for the Linguistically Diverse Classroom"	Spanish student edition; No Spanish teacher guide; Section on diverse language learners in teacher's guide	Materials in English and Spanish; Content is real world problem based; Delivered in the language of the Family Math Class leader	Introductory letters and family support brochures in English and Spanish; 15 of the 80 challenges available in Spanish	Spanish Teaching Companion and Spanish Vocabulary Package; ELL can explain through drawings, manipulatives, and algorithms; Multicultural extensions

An Analysis Matrix of Professional Development Models Used in Texas

Name	CGI	CMP	EDM	Family Math	Figure This!	Investigations
Strengths	Effective for students from diverse socio-economic, racial, and language backgrounds	One year of preparation before implementation; Ongoing professional development; Problems and activities interest middle school students	Scripted curriculum decreases amount of professional development required; Activities reinforce concepts providing an alternative to pencil and paper drill work	Stresses equity and family involvement; Informal learning experience and context-based; Hands on activities allow students and parents to enjoy math	Involves families in students' education	Curriculum design-well sequenced activities, integration of individual, group, and class discussions, and reflections
Concerns	Is most effective only when adopted by all teachers in a school	According to a report from the University of Washington (2000) the content is weak in number sense	Scripted curriculum may stifle teacher creativity; Gaps in student knowledge may occur if use of EDM begins in later grades; Professional development does not address ELL	Background knowledge of Family Math leaders varies-content may not be delivered as intended	Does not provide training on methods of delivering the content	More time than the training model is needed for teachers to effectively implement the curriculum

An Analysis Matrix of Professional Development Models Used in Texas

Name	Mathcounts	Mathworks	NCTM Navigations	Sharon Wells	Sheltered Instruction (SIOP)	Textteams
Developer and Year	Local NCTM Chapters and the National Society of Professional Engineers 1983	Texas State University-San Marcos 1996-Student Math camps 1998-Teacher Training	Various groups working for NCTM 2001-Navigations Workbooks 2005-E-workshops	Sharon Wells, former Texas teacher in Brownsville and Lubbock schools, Originated in Brownsville, TX 1993	Research grant awarded to Office of Educational Research and Improvement's Center for Research on Excellence, Education, and Diversity (CREDE) 1996	Texas Education Agency (TEA) 1980's 1990's-Textteams Math Institutes
Grade Level	6-8	4-8	Pre K-12	2-6	K-12	K-12
Training and Cost	School Handbook and training by veteran coaches-free; Competition-\$80 per team and \$20 per individual	4-week summer training and year-long Math Inquiry Group (MIG)-\$3500 per teacher, includes credit for a graduate course	E-workshops-\$75 per workshop; Navigations Workbooks-\$25.95-\$39.95 per book, 20% discount for NCTM members	Workshops, 6 hrs for each 6 weeks of instruction-\$7,500 curriculum fee per grade and \$3,750 maintenance fee per grade, plus consultant travel expenses, supplies, handouts	Institutes for teachers and administrators-\$650-\$700 per person	17 different Textteams Math Institutes provided by Leader or Master Leader-cost depends on trainer (e.g., \$0-\$500. . . per day)

An Analysis Matrix of Professional Development Models Used in Texas

Name	Mathcounts	Mathworks	Navigations	Sharon Wells	SIOP	Textteams
Use	500 Competitions Nationwide and Overseas	7 districts in Texas	Higher use in Alaska, the east & west coasts & some southern states	180 districts in Texas	Hundreds of schools in most of the 50 states; several other countries	Over 100,000 teachers statewide have attended 1 or more institutes
Curriculum and Content	Meets NCTM Standards for Grades 6-8; School Handbook with 300 challenging problems	Aligned to TEKS; Weaves in Algebra	Supplementary materials for teachers-Activities and problems that cover the NCTM Standards	Aligned to TEKS; Spiraling curriculum; Focus on problem-solving	30 indicators of effective sheltered instruction; 8 components; Used with any curriculum	Trained network of leaders who provide local training; Aligned with math and science TEKS
Method	Local, State, and National Competitions	Students learn by exploring and doing; Hands-on and Inquiry based	Teachers discuss lessons and ideas online; Inquiry-based	Teacher instructions and materials provided for each 6 weeks; Activities that address various learning styles	Series of methods and techniques for teachers to use to help ELL acquire English and content knowledge	Integrates manipulatives and technology with curriculum; Multiple representations; Questioning strategies; Connections to other content areas

An Analysis Matrix of Professional Development Models Used in Texas

Name	Mathcounts	Mathworks	Navigations	Sharon Wells	SIOP	Textteams
Applications to ELL	English only	Suitable for ELL and special populations; English only	English only	Materials for grades 2-5 available in Spanish; Designed for ELL	Designed for ELL; ESL taught through academic content	English only
Strengths	Generates excitement and energy for mathematics	MIGs build a community of teachers; Families are engaged; In-depth training of teachers; Activities and games make learning fun for the students	Linked to NCTM standards; E-workshops are cost-effective	Custom designed for Texas by a Texas teacher; Support workshops for each 6-weeks; Districts can speak with the author personally	Research based; Can be used with any curriculum; Specifically aims at ELL	Aligned to TEKS; 3-5 day institutes allow time for in-depth discussion of material; Institutes encourage collaboration and active participation
Concerns	Does not include all levels of students; May leave ELL students behind	Curriculum and teacher guide not available; Does not address ELL specifically	Not linked to any school curriculum; Not aligned to TEKS; Training is limited; Does not address ELL specifically	Very worksheet oriented; Problem-solving based curriculum, but lacks open-ended questions	Institutes are costly; Observation Protocol is complicated; Does not specifically address math content	Institutes are not being revised or developed; Institutes focus solely on TEKS; Follow-up and support after the institutes are not available

Topics to Cover

- Identified PDMs
- PDM Overviews
- PDM Summaries
- PDM Analysis



Topics Covered

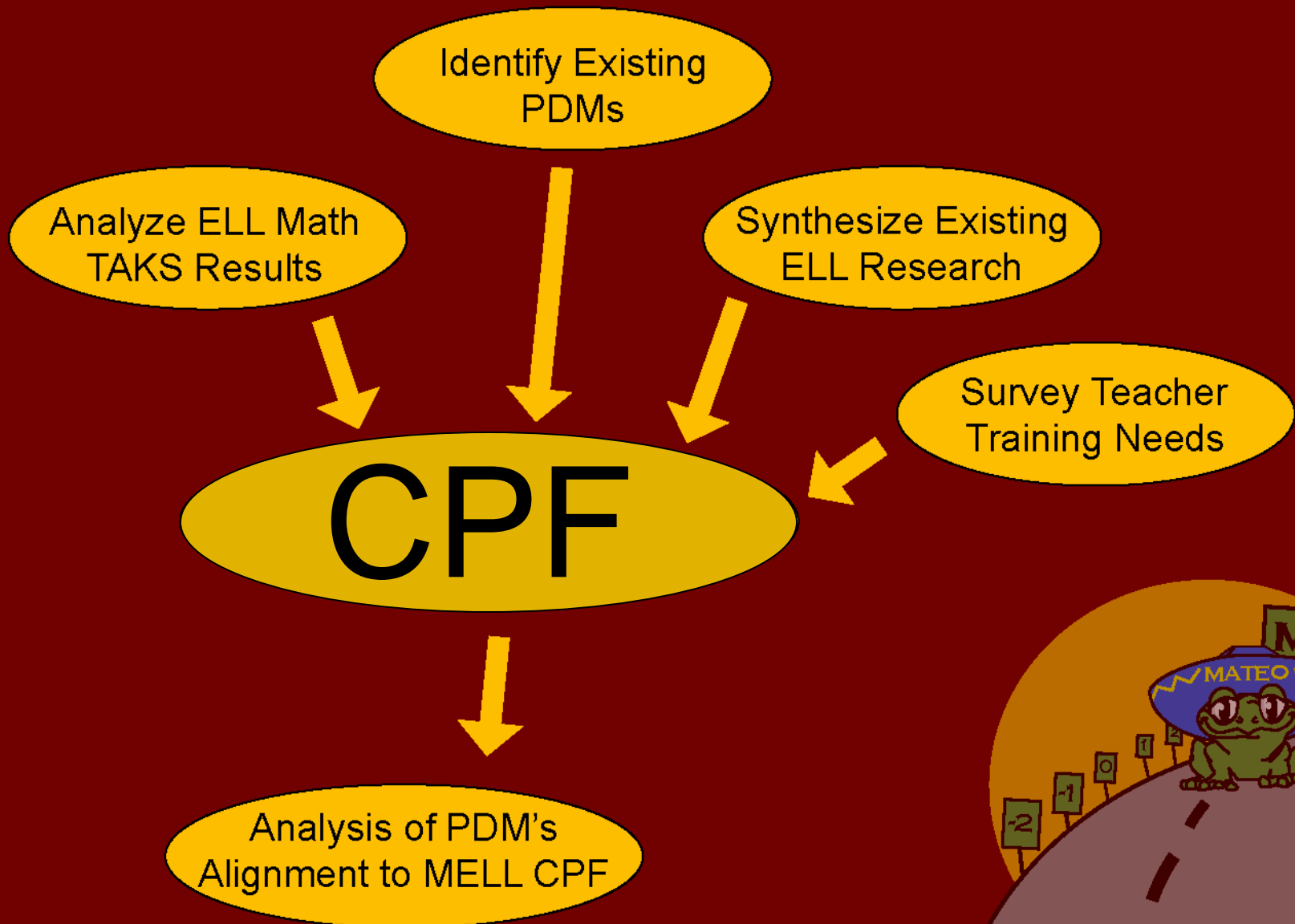
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Topics Covered

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- PDM Overviews
- PDM Summaries
- PDM Analysis





Sections of TSUS MELL CPF

1. Learning Atmosphere &
Physical Environment
2. Instructional Practices
3. Mathematics Content & Curriculum
4. Language Practices
5. Family & Community Involvement
6. Assessment of Student Learning

Model Analyses to Discuss

- Cognitively Guided I.
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- Everyday Math
- Family Math
- Figure This!
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Model Analyses Discussed

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Topics Covered

- ☑ Identified PDMs
- ☑ PDM Overviews
- ☑ PDM Summaries
- ☑ PDM Analysis



Further Investigation

- TSUS Website: www.tsusmell.org
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Overview of Each PDM

- Origination
- Administration
- Induction
- Implementation
- Instigation
- Philosophy



Structure of Each Summary

- Introduction
- Details of the model
 - Curriculum & Content
 - Pedagogy
 - Administration
- Specific Application to ELL
 - Language Components
 - Learning Styles
 - Student Assessment
- Model Assessment
- Commentary



Cognitively Guided Instruction

Overview

Highlights of the Analysis

1. Learning Atmosphere &
Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community
Involvement
6. Assessment of Learning

Particular Strengths



Connected Math Project

Overview

Highlights of the Analysis

1. Learning Atmosphere & Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community Involvement
6. Assessment of Learning

Particular Strengths



Everyday Mathematics

Overview

Highlights of the Analysis

1. Learning Atmosphere &
Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community
Involvement
6. Assessment of Learning

Particular Strengths



Family Math (EQUALS)

Overview

Highlights of the Analysis

1. Learning Atmosphere & Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community Involvement
6. Assessment of Learning

Particular Strengths



Figure This!

Overview

Highlights of the Analysis

1. Learning Atmosphere & Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community Involvement
6. Assessment of Learning

Particular Strengths



Investigations

Overview

Highlights of the Analysis

1. Learning Atmosphere & Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community Involvement
6. Assessment of Learning

Particular Strengths



MATHCOUNTS

Overview

Highlights of the Analysis

1. Learning Atmosphere &
Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community
Involvement
6. Assessment of Learning

Particular Strengths



Mathworks

Overview

Highlights of the Analysis

1. Learning Atmosphere & Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community Involvement
6. Assessment of Learning

Particular Strengths



NCTM Navigations

Overview

Highlights of the Analysis

1. Learning Atmosphere & Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community Involvement
6. Assessment of Learning

Particular Strengths



Sharon Wells Math

Overview

Highlights of the Analysis

1. Learning Atmosphere & Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community Involvement
6. Assessment of Learning

Particular Strengths



Sheltered Instruction O. P.

Overview

Highlights of the Analysis

1. Learning Atmosphere &
Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community
Involvement
6. Assessment of Learning

Particular Strengths



Textteams

Overview

Highlights of the Analysis

1. Learning Atmosphere & Physical Environment
2. Instructional Practices
3. Math Content & Curriculum
4. Language Practices
5. Family & Community Involvement
6. Assessment of Learning

Particular Strengths

