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*A Compilation of Survey Data and Focus Group Findings: Texas Secondary
Mathematics Teachers' Views of Needed Professional Development to Support
Mathematics Instruction for English Language Learners*

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A Compilation of Survey Data and Focus Group Findings: Texas Secondary Mathematics Teachers' Views of Needed Professional Development to Support Mathematics Instruction for English Language Learners

Introduction to the Project

The primary goal of this product is to support mathematics instruction for English Language Learner (ELL) students in Texas, specifically students at the secondary level, through citing secondary mathematics teachers' perceptions of needed professional development in this area. Such professional development training needs include, but are not limited to, in-service training, supportive instructional resources and tools, and implementation of specific professional development programs. The aforementioned perceived training needs were ascertained through the collection and analysis of data from two key resources: survey data and focus group findings. There are two limitations that must be mentioned. First, there is no indication that teachers based their comments on research findings or anything other than their own experiences and/or opinions. Second, the sample sizes are small. Because of these two limitations, the results are reported, but there has been no attempt to generalize the results.

An interview survey was distributed to teachers in every Regional Educational Service Center (ESC) area of the state of Texas, with emphasis on areas with high populations of ELL students. There were 390 surveys distributed among the 20 regional service areas in Texas, of which 93 were returned and analyzed. Select high school mathematics teachers, some of whom completed the survey, were invited to participate in small focus group interviews. Lamar University (LU) hosted a total of four focus groups throughout the state, including focus groups in central Texas, south Texas, southeast Texas, and west Texas. The number of participants in each focus group varied, ranging from five to fourteen participants. The analysis of data collected from the surveys and focus groups have contributed to the development of a record of

teachers' insights on needed professional development for supporting secondary mathematics instruction for ELL students.

The project's targeted audience was high school mathematics teachers who were currently teaching or had taught a significant number of ELL students. However, the project coordinators also interviewed other educators, including secondary ELL/ESL teachers who taught no specific content discipline, middle school and high school mathematics curriculum coordinators, middle school mathematics teachers, elementary ELL/ESL teachers, and school administrators.

A Summary of Survey Data Findings

Distribution of Surveys

As a first step in identifying secondary mathematics teachers' perceived professional development needs to better support mathematics instruction for their ELL students, survey forms were mailed to 130 randomly selected high schools throughout the state of Texas, including each of the 20 Texas Education Service Areas. Each packet in the January 2005 distribution was addressed directly to a high school principal with a cover letter requesting that the principal distribute the survey to three mathematics teachers. Postage-free envelopes were provided and \$5.00 gift certificates were offered to responders. By the requested return date of February 4th, 93 surveys were received, representing a 23.8% rate of return.

Summary of Survey Questions and Responses

In this section, survey questions are detailed and responses to selected questions are discussed. Additionally, data plots are provided for selected questions. A copy of the survey

form, with letters, can be found in Appendix A and the complete transcription of responders' comments is in Appendix B.

1. What do you see as your school's greatest training need for enhancing mathematics instruction for ELL students?

Responses to this question can be grouped into 6 categories, with some cross-category responses.

- Issues dealing directly with language; suggestions for materials or textbooks, or requests for interpreters and/or Spanish lessons for teachers (32 comments)
- Requests for specific teaching techniques to help ELL students succeed (15 responses)
- Issues dealing with the students themselves, suggestions for placing students in special classes, or motivating them to learn (11 responses)
- Concerns about administrative issues such as requiring teachers to attend workshops, smaller class sizes for teachers of ELL students, more time for planning, and motivation for teachers to look kindly upon ELL students (approximately 10 responses)
- Requests for authentic ways to assess ELL students' abilities and needs (only 2 comments)

2. Do you hold one of the following specialized credentials for instructing ELL students?

Responses to this question indicate that few teachers hold specialized credentials

- 86% hold no credentials
- Only 1 teacher holds a CLAD certificate
- 6 teachers hold ESL certificates
- 5 teachers hold various other applicable certificates

3. Does your school have an employed ELL teacher on staff?

4. Do you think it is necessary for your school to employ an ELL teacher?

As indicated in Figure 1, responses to Questions #3 and #4 implied that 85% of the responders' schools had no ELL teacher on staff, while 97% of the responders felt that their schools should fill this position.

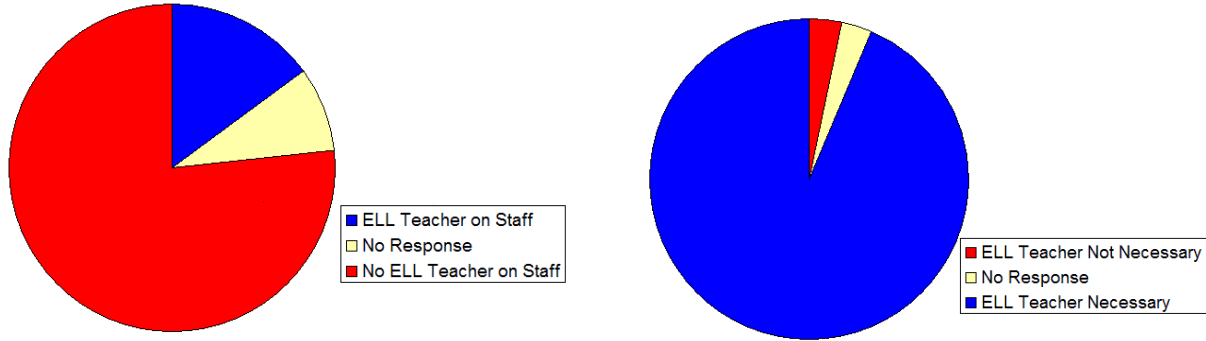


Figure 1

Several comments on Question #4 took the form of suggestions:

- Provide classroom aides proficient in Spanish
- Hire school based ELL coordinators
- Hire full time ELL advisors
- Ensure that ELL teachers are proficient in teaching mathematics

5. *Have you received any training or professional development in working with ELL students?*

6. *If yes, how helpful was the training?*

As shown in Figure 2, only 53% of responders have experienced professional development, ranging from a half-day program to extensive workshops; of those who have experienced professional development, 22% found the programs to be very helpful and 61% found the experiences to be somewhat helpful. Overall, only 44% of the responders have experienced professional development that they described as “helpful.”

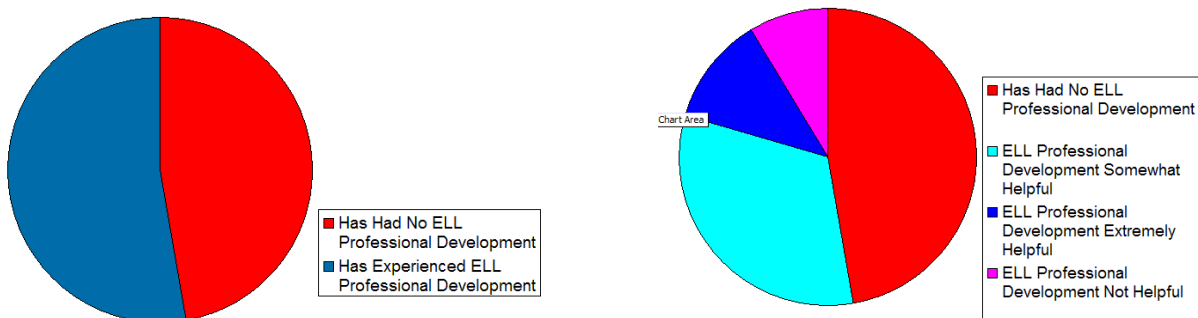


Figure 2

7. *Approximately how many ELL students do you currently teach?*

1. 0 2. 1-10 3. 10-20 4. 20-30 5. more than 30

8. *Rank the population size of the ethnic background of ELL students you currently teach, with 1 representing the largest population).*

Few responders reported more than 10 ELL students this school year, while 62% reported having 1 to 10 students in classes. Responses to Question #8 indicated that 92% of the ELL students in responders’ classrooms are Hispanic, while 7% are Asian and 1% was listed as “other.” These data are detailed in Figure 3.

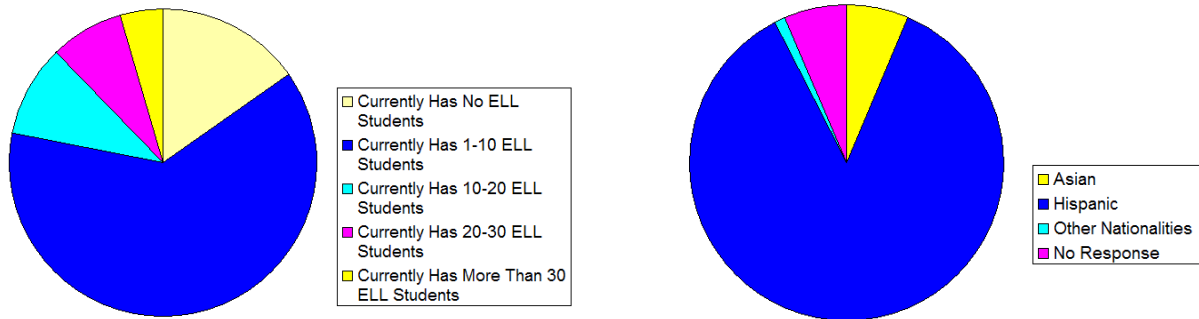


Figure 3

9. *In comparison to the general student population of your school, how well do your ELL students perform in mathematics?*

- 3 = very well, 2 = similar, and 1 = not as well

As shown in Figure 4, only 9% of ELL students outperform other students, while 41% perform about as well as other students, and 50% do not perform as well as other students. Comments on this question mentioned language and economic disadvantages for many students.

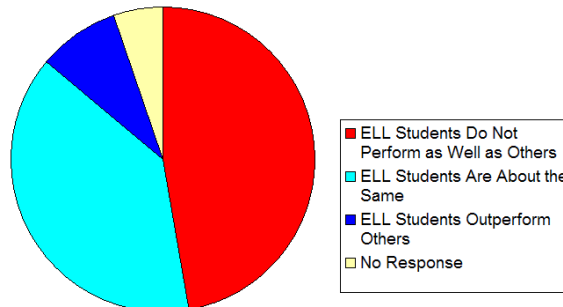


Figure 4

10. *Are you aware of the kinds of instructional and assessment modifications that should be used in order to make your lesson content comprehensible to your ELL students?*

Approximately half the responders said that they are aware of instructional and assessment modifications, but comments most often mentioned “common sense” and requests for more useful teaching techniques rather than accommodations for ELL students.

11. *Would you support extended day opportunities for ELL students so that they can receive help with their schoolwork and/or participate in extracurricular activities?*

While 90% of the responders felt that such opportunities should be provided, many stated that opportunities are already available and most comments raised issues of staffing, funding, and/or students with after school jobs.

12. *Would you encourage training on designing alternative assessment tasks and a meaningful assessment plan that uses a diversity of assessment measures to assess ELL students?*

Only 22% of responders favored training on designing alternative assessment tasks and a meaningful assessment plan. The majority of teachers stated that ELL students must or should be assessed along with the other students.

13. *Would you support creating a teacher academy to provide rigorous professional development to teachers of ELL students with a goal of introducing best practices into mathematics classrooms?*

Responders overwhelmingly rejected the concept of creating a teacher academy. One comment that seemed to sum up the general attitude was, “Just an in-service.” However, one interesting comment stated that the word “rigorous” made this seem less than “teacher friendly.”

14. *Are you interested in participating in a teacher focus group where the focal point will be to identify and discuss current secondary mathematics teachers’ training needs for enhancing the effectiveness of mathematics instruction for ELL students?*

15. *Are you interested in participating in a week-long summer institute where the focus will be to provide teachers with effective teaching strategies and materials for teaching ELL students?*

Questions #14 and #15 solicited information about teachers' interest in attending focus group sessions and summer workshops for ELL issues. Some of the responders eventually attended focus group sessions and a few attended a workshop at LU during the summer of 2005.

16. *If you could change one thing about your school's approach to educating ELL students, what would it be?*

Additional comments are appreciated and welcomed:

While many of the final responses were very similar to those seen in Question #1, many more teachers took this opportunity to make suggestions that should be directed toward administrators. Teachers are concerned about:

- Class sizes
- The numbers of ELL students in each class
- Additional faculty and staff to support ELL students in general and Hispanic students in particular
- The availability of quality professional development in mathematics for teachers of ELL students
- Ensuring that everyone within a school becomes invested in helping ELL students
- Their own overloaded work schedules

The comments in these sections should be read as they were written – in the teachers' voices. While it is not feasible to include specific comments here, all transcribed comments from the survey are provided in Appendix B.

Clearly, teachers have strong opinions about mathematics for ELL students. This survey was designed to determine their perceived needs for professional development to assist ELL students achieve at a high level. Survey data are subjective; the questions asked for opinions and desires. It is obvious that few teachers have experienced professional development that they consider valuable and that many teachers desire the chance to do so. The vast majority of teachers want to help their ELL students make adequate progress in mathematics.

A Summary of Four LU MELL Initiative Focus Groups

Summary of Participant Selection and Data Collection

Focus groups are one means of complementing survey data and are an increasingly popular way to learn about teachers' opinions and attitudes. They are in-depth, qualitative interviews with a small number of carefully selected people who are brought together to discuss a particular topic (Morgan, 1988). In order to ascertain teachers' perceived training needs to better support mathematics instruction to their ELL students, LU hosted four focus group interview sessions. The first focus group (FG1) was held in Beaumont, TX, the second (FG2) was held in Alpine, TX, the third (FG3) was held in San Antonio, TX, and the final session (FG4) was held in Brownsville, TX.

- FG1: Beaumont, TX; 6 participants from southeast Texas school districts
- FG2: Alpine, TX; 7 participants from west Texas school districts
- FG3: San Antonio, TX; 14 participants from central Texas school districts
- FG4: Brownsville, TX; 9 participants from south Texas school districts

Each group offered a unique perspective on identifying the greatest professional development needs in Texas for enhancing mathematics instruction for secondary ELL students. Detailed information on each session is given in the focus group findings section of this report.

Participants for each focus group were selected based on their documented interest expressed in the surveys distributed prior to formation of the focus groups, recommendations made by school principals and vice-principals, and recruitment from LU MELL project investigators based on their prior knowledge of schools with high ELL student populations. As previously mentioned, participants were primarily high school mathematics teachers who were currently teaching or had taught a large number of ELL students. The composition of each focus

group consisted of teachers from different schools and/or school districts. Care was taken to ensure that teachers who knew one another were not recruited for the same sessions because research indicates that focus group participants are generally more open and less guarded with people they do not know (Morgan, 1988).

As potential participants were recruited, they received a brief description of what the group would be about, as well as assurances that their participation was entirely voluntary and that their confidentiality would be protected. Each participant was also paid a small stipend, reimbursed for travel expenses, and provided lunch before the start of the session. In hopes of ensuring participants were relaxed about the sessions, a comfortable, relaxed atmosphere was created for each of the focus group sessions. Data from each focus group was captured through video recording, audio recording, and manual note taking. The video recording captured both verbal and nonverbal information and did not seem to inhibit any of the participants, audio recording allowed for verbal information to be obtained verbatim, and manual note taking involved publicly capturing the key points of the discussion by handwriting them on easel pads positioned around the room.

Protocol for Focus Groups

FG1 and FG3 were conducted by two facilitators and FG2 and FG4 were conducted by one facilitator. There were a total of three facilitators. Facilitator 1 attended each session with the exception of FG2, facilitator 2 attended two sessions and facilitator 3 attended one session. All facilitators were skilled in maintaining good group dynamics, had the responsibility of keeping the group focused, and ensured the generation of lively and productive discussions about needed professional development for secondary mathematics teachers in Texas. Moderating styles were tailored to fit respective groups. However, in general, each 2 hour session began with a general

discussion of the purpose of the session, structure of the focus group, anticipated protocol for the session, and an introduction of the three key questions participants were expected to discuss during the session. The questions were formulated by the project researchers based on the project goals and survey responses. The group then discussed the questions through talking with one another, asking public questions about what they heard, and reacting to one another's comments. The three key questions posed at each session were:

- Question #1:** What is good about professional development for teachers of English Language Learners in Texas?*
- Question #2:** What aspects of professional development for teachers of English Language Learners in Texas need improvement?*
- Question #3:** What do you believe are the greatest professional development needs in Texas for enhancing mathematics instruction for secondary English Language Learner students?*

Each question was purposely phrased in a neutral, open-ended manner in order to secure multiple responses and to ensure that the formulation of the question had no effect on the responses. The questions were carefully sequenced so that the general questions preceded the more difficult ones. Leading questions that suggested the facilitator's opinion or an anticipated answer were avoided. After participants finished discussing Question #1, Question #2 was introduced. Likewise, Question #3 was introduced after the conclusion of the discussion of Question #2. After all questions were discussed, participants were asked to consensually rank the top three responses for each question. The ranked responses, along with other responses, on perceived needed professional development are discussed in the next section.

Findings of Four LU MELL Initiative Focus Groups

Several focus group discussions for individual questions overlapped, so there are similar responses for different questions. The following list summarizes the most frequent responses and hence identifies participating teachers' perceptions of needed professional development to

better support mathematics instruction for high school ELL students. Later in this section, discussions of all focus group sessions are provided and Tables 1 – 3 show keys points from all groups.

1. Professional development programs need to provide professional development specific to improving mathematics instruction for ELL students.
2. Professional development programs need to provide training that separates learning mathematics from learning a language.
3. Professional development programs need to provide professional development from experts with experience teaching mathematics to ELL students in lieu of general teachers or researchers.
4. School districts need to recruit and monetarily reward certified bilingual mathematics teachers. Hence, these teachers will be housed at local school and will be able to better train non-bilingual certified mathematics teachers.
5. Professional development programs need to provide training that introduces best teaching practices for ELL students at varied ability levels.

Brief Discussion of Questions and Comparison of Focus Group Findings

Question #1

In response to Question #1, which addressed favorable aspects of professional development for mathematics teachers of ELL students, all participants in all sessions agreed that they were not aware of any professional development for secondary mathematics teachers of ELL students. Many teachers commented that they had attended general professional development sessions but the emphasis of these sessions was language – not mathematics. Hence, the participants were unable to answer question one because none had participated in nor had any knowledge of any professional development for secondary teachers of ELL students that was specific to the content area of mathematics. Participating teachers reasoned that advertising for such professional development programs is nonexistent and that no mention of such programs or training had been distributed to districts or teachers in their respective areas.

Question #1: What is good about professional development for teachers of English Language Learners in Texas?

Table 1: Question #1 Key Responses From Each Focus Group Session

Southeast Texas	West Texas	Central Texas	South Texas
1. None available	1. None available	1. None available	1. None available
2. Many teachers incorporate general PD into ELL classrooms	2. Combine general PD training with personal ideas	2. Multidiscipline training exists	2. There is general ELL training for elementary school teachers
-----	3. Training for procedures for standardized testing, but no teaching strategies	-----	-----
-----	4. School administrators provide literature for teachers	-----	-----

Question #2

In response to Question #2, which addressed perceived professional development improvement needs, each focus group agreed that the first mode of improvements should entail offering some type of consistent, required professional development specific to teaching mathematics to ELL students. Additional comments in response to Question #2 from FG1 included introducing multi-district professional development sessions for mathematics teachers. Such sessions would, ideally, be composed of teachers from different districts, where the participating districts have similar demographics. FG1 participants expressed an interest in communicating with teachers who teach in districts similar to their own and who deal with similar issues. FG1 participants also highlighted a concern for placement procedures for ELL students in mathematics classroom, specifically their observation that many of the teachers in the southeast Texas area with ELL students are generally not Master Teachers and have little experience assisting such students.

Responses for Question #2 from participants in FG2 included an expressed interest in professional development that provides insight into alternate assessment techniques for students who are not proficient in the English language. Participating teachers explained their concerns with assessing a student’s knowledge of a mathematical concept when the teacher is unable to verbally communicate with the student. In addition to training in alternate forms of assessment, FG2 teachers perceived a need for annual mandatory professional development sessions for all teachers, not only ELL teachers, language teachers, or special population teachers. FG3 and FG4 arrived at similar conclusions. However, FG4 concurred that such sessions should be held in the summer months or immediately prior to the beginning of a new academic year and the selected professional development model should be a consistent model instead of using a different model for each professional development session. Other responses to Question #2 can be reviewed in Table 2.

Question #2: What aspects of professional development for teachers of English Language Learners in Texas need improvement?

Table 2: Question #2 Key Responses From Each Focus Group Session

Southeast Texas	West Texas	Central Texas	South Texas
1. PD specific to the subject of mathematics	1. PD specific to the subject of mathematics	1. Training for mathematics teachers to become ELL specialists	1. PD specific to the subject of mathematics
2. There should be multi-district PD training (involving districts with similar demographics)	2. Mandatory yearly training for ALL teachers	2. Mandatory yearly training for ALL teachers	2. Required PD for mathematics teachers outside of the school year
3. Experienced teachers should preside over PD	3. Training in using dual language software	3. External experts should conduct training	3. Stop constant jump from PD program to program
4. Better advertise PD for teachers of ELL students	-----	4. Communication between school ELL staff and mathematics teachers	-----

Question #3

In response to Question #3, which addressed perceived greatest professional development needs, FG1 ranked the need for bilingual certified mathematics teachers and corresponding training for those teachers, better communication and publicity of available professional development for secondary mathematics teachers with ELL students, and standardization of professional development for mathematics teachers of ELL students across districts as their greatest perceived needs. FG2 agreed that all needs discussed were their greatest (see above discussion on FG2 for each question) and hence had difficulty shortening the list. However, FG2 added a need for training on using bilingual resources when using collaborative learning groups in the mathematics classroom.

FG3 added the following as their greatest perceived needs: professional development that provides specific mathematics techniques that assist students at different levels of English proficiency, including new to experienced learners; professional development that provides specific techniques for teaching reading in the content area of mathematics, including real life applications; incorporating an explanation of country-specific mathematics curricula into professional development sessions. Over half of the participants in FG3 commented that their ELL students' level of English proficiency vary from extremely poor to below average to moderate and consequently, the techniques they use for students at lower levels are not applicable to other ELL students, and vice versa. Participating teachers also stated that they often have no knowledge of the math curricula in their ELL students' native country and hence are not able to effectively measure what they know, how they were taught it, and when it was introduced.

Like FG3, FG4 expressed a concern with not being aware of mathematics curricula differences between countries and indicated a need for more professional development sessions in such areas. They also requested more training in using technology with ELL students and an introduction in their district (specific schools mentioned) to high school dual language programs in the content area of mathematics.

Question #3: What do you believe are the greatest professional development needs in Texas for enhancing mathematics instruction for secondary English Language Learner students?

Table 3: Question #3 Key Responses From Each Focus Group Session

Southeast Texas	West Texas	Central Texas	South Texas
1. Need for training in reading in the content area	1. Training specific to mathematics vocabulary	1. Training for reading in content area	1. More training in technology
2. Standardize PD for math teachers across Texas	2. Tool to test mathematical ability of students, with little regard to language	2. Need for specific techniques for ELL students at different levels	2. Invite math teachers from Mexico to give presentation on differences in curricula
3. Need bilingual certified math teachers	3. Training on mathematics register vs. language register	3. Separate learning the language from learning mathematics	3. Dual language program – not bilingual program
4. Provide incentives for math Master teachers to teach ELL students	4. Introduce activities and resources	4. Training that incorporates country specific math curriculum	4. Support group

Mapping of Perceived Needs to Existing Programs

Researchers at Lamar University collected data concerning the perceived professional development needs of high school teachers, while researchers at Texas State University - San Marcos analyzed existing professional development programs and compiled a summary of 12 such programs. A mapping of the Lamar University data onto the Texas State University - San Marcos analysis will provide foundational work for additional research. To provide a reference,

brief excerpts of the report prepared at Texas State University - San Marcos (Fisher, et. al., 2005) are included in Appendix E.

While not all reviewed models directly address mathematics teaching at the high school level, several seem to reflect the perceived professional development needs of survey responders and focus group participants. The following matrices represent a mapping of focus group summaries onto each of these models: Cognitively Guided Instruction (Cog. G. I.), Connected Mathematics Project (Con. Math Project), Everyday Math, Family Math EQUALS (EQUALS), Figure This! Math Challenges for Families (Figure This!), Investigations, MathCounts, MathWorks, NCTM Navigations, Sharon Wells, Sheltered Instruction Observation Protocol (SIOP), and TexTeams. All 12 models are referenced in Tables 4, 5, and 6, with brief discussions for each. The codes in the matrices indicate the questions and responses involved. For example, Q3.1 in the cell for Focus Group 1 and Connected Mathematics Project references the Southeast Texas group’s first response to Question #3.

Table 4: Map of Perceived Needs to Existing Professional Development Models (Models 1-4)

	Cog. G. I.	Con. Math Project	Everyday Math	EQUALS
F. Group 1 (SE TX)		☺ Q3.1		☺ Q2.1, Q3.1
F. Group 2 (West TX)	☺ Q3.2, Q3.3			☺ Q2.1, Q3.4
F. Group 3 (Central TX)		☺ Q3.1		☺ Q3.1
F. Group 4 (South TX)		☺ Q2.3	☺ Q3.1	☺ Q2.1

In this matrix for the first four models, it seems that Cognitively Guided Instruction provides a tool for testing the mathematical abilities of students and addresses the issue of the mathematics register. The Connected Mathematics Project provides assistance to teachers in content area reading and is a program that is constant over time. Everyday Math includes professional development in the uses of technology to teach mathematics. Family Math EQUALS is specific to the area of mathematics, provides assistance to teachers in content area reading, and includes classroom ready activities and resources.

Table 5: Map of Perceived Needs to Existing Professional Development Models (Models 5-8)

	Figure This!	Investigations	MathCounts	MathWorks
F. Group 1 (SE TX)				☺ Q2.2, Q2.3
F. Group 2 (West TX)		☺ Q3.4	☺ Q3.4	☺ Q3.4
F. Group 3 (Central TX)				☺ Q2.4
F. Group 4 (South TX)	☺ Q3.1			☺ Q2.2, Q3.4

The model Figure This! Math Challenges for Families addresses the perceived need for assistance in the area of technology. Investigations and MathCounts provide classroom ready activities and resources. MathWorks provides professional development to teachers across district lines over which experienced teachers preside; additionally, the model involves teachers outside the normal school year, provides support after the sessions, and encourages communications among stakeholders.

Table 6: Map of Perceived Needs to Existing Professional Development Models (Models 9-12)

	NCTM Navigations	Sharon Wells	SIOP	TexTeams
F. Group 1 (SE TX)			☺ Q2.1	☺ Q2.2
F. Group 2 (West TX)	☺ Q3.4	☺ Q3.4	☺ Q2.1, Q3.2, Q3.4	☺ Q3.4
F. Group 3 (Central TX)			☺ Q2.3	
F. Group 4 (South TX)	☺ Q3.1		☺ Q2.1	

This final matrix indicates that the NCTM Navigations series provides assistance in the area of technology and classroom ready activities and resources. The Sharon Wells model provides classroom ready activities and resources. The model for Sheltered Instruction Observation Protocol provides professional development that is specific to mathematics, with external experts to conduct the sessions; additionally, the model includes a tool for testing the mathematical abilities of students and provides classroom ready activities and resources. The TexTeams model provides professional development sessions across district lines and classroom ready activities and resources.

As previously mentioned, few of these professional development models specifically address needs at the high school teaching level. However there is evidence that almost all of these models can be instructive as new professional development tools are designed specifically to address the perceived needs of high school mathematics teacher in Texas.

Future Work

Each of the five universities involved in the TSUS MELL Initiative has completed a portion of the project. This report details the work at LU. Researchers at Texas State University - San Marcos have analyzed existing professional development programs; researchers at Sam Houston State University have taken a closer look at ELL mathematics students' performance on the Texas Assessment of Knowledge and Skills (TAKS); researchers at Sul Ross State University have completed a review of the literature; and researchers at Angelo State University have studied curricula and practices in preservice programs in Texas. All of this work supports the development of instructional resources designed to increase the effectiveness of mathematics instruction for students who are ELL. The TSUS MELL Steering Committee assisted the researchers at Texas State University - San Marcos in the compilation of a Classroom Practices Framework that is supported by each segment of the project. Other products will develop from the completed work and the Frameworks, including a "What Works" Matrix and Teacher's Guide, further analysis of professional development programs in Texas, and a Quick Start Module for Texas mathematics teachers of ELL students.

Appendix A - Secondary Mathematics Teachers' Training Needs for ELL (English Language Learner) Instruction Survey

January 13, 2005

Dear Colleague: (Principal)

The prevailing achievement gap in mathematics between the English Language Learner (ELL) student population and non-ELL student population demands immediate action. Lamar University is part of a major funding effort by the Texas State University System (TSUS) to identify secondary mathematics teachers' training needs for enhancing the effectiveness of mathematics instruction for students who are English Language Learners (ELLs). The grant involves five TSUS universities and has a monetary value in excess of \$1,000,000. Our goal is to develop and provide a series of resources for secondary teachers of ELL students throughout the state of Texas that are expected to improve teacher efficacy and ELL student proficiency in the area of mathematics.

We need your school's help. We are asking that you distribute the surveys included in this packet to a select group of mathematics teachers at your school, specifically teachers who have a high enrollment of ELL students in their classes or teachers or other educators who have experience working with ELL students. Please encourage the teachers to complete and return the survey. It is important that all teachers selected to respond to this survey participate so that results will fairly represent teachers teaching secondary mathematics to ELL students. Also, in helping us identify the specific types of training needs that mathematics teachers and other educators need to improve mathematics instruction, we hope to raise ELL student achievement in mathematics.

Thank you for encouraging your mathematics teachers and any other of your school's educators who have experience working with ELL students to complete this survey. **Please ensure surveys are postmarked by January 31, 2005.** Pre-addressed, postage-paid envelopes are provided along with the number of surveys we request that you distribute.

If you have any questions pertaining to the survey or goals of the project, please contact:
Dr. Sandra Richardson

Mathematics Department
P.O. Box 10047
Beaumont, TX 77710
409-880-7946 (Office)
richardson@math.lamar.edu

Sincerely,

Sandra Richardson, Ph.D.
Assistant Professor of Mathematics

January 13, 2005

Dear Colleague: (Mathematics Teacher)

Thank you for participating in this brief survey. The prevailing achievement gap in mathematics between the English Language Learner (ELL) student population and non-ELL student population demands immediate action. The purpose of this survey is to identify current secondary mathematics teachers' training needs for enhancing the effectiveness of mathematics instruction for students who are English Language Learners (ELLs). This project is part of a major funding effort by the Texas State University System (TSUS), involves five TSUS universities, and has a monetary grant in excess of \$1,000,000. The joint effort of all involved affiliates is to develop and provide a series of resources for secondary mathematics teachers of ELL students. **We need your help.** It is important that all teachers selected to respond to this survey participate so that results will fairly represent teachers teaching secondary mathematics to ELL students. As a token of our appreciation, we will send \$5 Wal-Mart gift certificates by mail to teachers who complete and return the survey.

Your answers will be kept strictly confidential. Results of the survey will be reported only in summary or statistical form, so that neither individuals nor their schools can be identified.

Thank you again for completing this survey. **Please ensure surveys are postmarked by January 31, 2005.** Please use the pre-addressed, postage-paid envelope that is provided to seal your response by this date.

If you have any questions pertaining to the survey or goals of the project, please contact:
Dr. Sandra Richardson

Mathematics Department
P.O. Box 10047
Beaumont, TX 77710
409-880-7947 (Office)
richardson@math.lamar.edu

Sincerely,

Sandra Richardson, Ph.D.
Assistant Professor of Mathematics

Secondary Mathematics Teachers' Training Needs for ELL (English Language Learner) Instruction Survey

Please answer all questions honestly and candidly by either circling or writing your applicable response. We appreciate all comments. Please include any comments you deem appropriate in the blank space after each corresponding question. Space is allotted for general comments at the end of the survey.

Surveys should be postmarked by January 31, 2005. See cover letter for more detailed information.

Name & Position: _____

School: _____

District: _____

Total years in position: _____

Grade level you teach (if applicable): _____

1. What do you see as your school's greatest training need for enhancing mathematics instruction for ELL students?

2. Do you hold one of the following specialized credentials for instructing ELL students? (*Circle all that apply.*)

- a. I do not have a specialized credential for instructing English language learners.
- b. I am CLAD (Crosscultural, Language and Academic Development) or BCLAD (Bilingual, Crosscultural, Language and Academic Development) certified.
- c. I am ESL (English as a Second Language) or ESOL (English as a Second or Other Language) certified.
- d. I have a Bilingual Certificate of Competence (BCC).
- e. I have a Language Development Specialist Certificate (LDS).
- f. I have a Bilingual Crosscultural Specialist Credential.
- g. Other (*please specify*): _____

3. Does your school have an employed ELL teacher on staff?

Yes No

4. Do you think it is necessary for your school to employ an ELL teacher?

Yes No

5. Have you received any training or professional development in working with ELL students?

Yes No

6. If yes, how helpful was the training?
3 = extremely helpful, 2 = somewhat helpful, and 1 = not helpful
3 2 1
-
-
7. Approximately how many ELL students do you currently teach?
0 1-10 10-20 20-30 more than 30
8. Rank the population size of the ethnic background of ELL students you currently teach, with 1 representing the largest population).
____ Hispanic
____ Asian/Pacific Islander
____ Other (please specify _____)
9. In comparison to the general student population of your school, how well do your ELL students perform in mathematics?
3 = very well, 2 = similar, and 1 = not as well
3 2 1
-
-
10. Are you aware of the kinds of instructional and assessment modifications that should be used in order to make your lesson content comprehensible to your ELL students?
Yes No
-
-
11. Would you support extended day opportunities for ELL students so that they can receive help with their schoolwork and/or participate in extracurricular activities?
Yes No
-
-
12. Would you encourage training on designing alternative assessment tasks and a meaningful assessment plan that uses a diversity of assessment measures to assess ELL students?
Yes No
-
-
13. Would you support creating a teacher academy to provide rigorous professional development to teachers of ELL students with a goal of introducing best practices into mathematics classrooms?
Yes No
-
-

14. Are you interested in participating in a teacher focus group where the focal point will be to identify and discuss current secondary mathematics teachers' training needs for enhancing the effectiveness of mathematics instruction for ELL students?

Yes No

15. Are you interested in participating in a week long summer institute where the focus will be to provide teachers with effective teaching strategies and materials for teaching ELL students?

Yes No

16. If you could change one thing about your school's approach to educating ELL students, what would it be?

Additional comments are appreciated and welcomed:

Thank you for completing this survey!

Yes, please send me a \$5 gift certificate to Wal-Mart by return mail for completing the survey.
 No, I am not requesting that you send me a \$5 gift certificate to Wal-Mart by return mail for completing the survey.

Appendix B – Responders’ Comments for the Secondary Mathematics Teachers’ Training Needs for ELL (English Language Learner) Instruction Survey

Question #1: What do you see as your school’s greatest training need for enhancing mathematics instruction for ELL students?

1. Better training for teachers to help youth with actual classroom techniques and skills for bilingual.
2. Vocabulary and reading comprehension.
3. Bilingual classes for ELL students.
4. Teachers working with ELL students should have an understanding of what is being taught in class means in Spanish, at least major topics, themes or concepts. Also, follow up with students’ level of understanding (math) to continue to expand and build on.
5. Training for teachers who want to increase their ability to communicate on a personal and educational level. We need to be able to also communicate with parents of these students.
6. Some students are not on grade level achievement and could not pass out state exams in another language much less English.
7. MOTIVATION and of course vocabulary. Their arithmetic skills tend to be above-average.
8. Hands on training of how to implement modifications and training of what modifications can be made.
9. Lack of training, time to do the training, time to plan implementations of the training, and making the training applicable to the subject of mathematics.
10. Teaching non-Spanish speakers to deal with non-English speaking students.
11. Regular Ed teachers need materials and thorough training.
12. Multi-lingual texts.
13. Attending more workshops on ELL students.
14. Tools and techniques proven to succeed in teaching Math specific vocabulary.
15. Alignment between regular teacher and ELL teacher; peer grouping for ELL students; communication between teachers; team-teaching opportunities.
16. More assistance with word problems.
19. Tutoring time with a Spanish speaking instructor so that the math concepts are what are being taught and not a combination English/math lesson.
22. Interpreter – proficient in math.
23. Learning terminology and its usage.
24. TAKS; grouping ELL students to fully utilize the limited resources (1 ESL aide); basic Spanish for non-Spanish speaking teachers (subject specific – not conversational).
25. Most students have the mathematical skills to succeed. However, they lack the language and become frustrated. This is where the training is needed; someone who can successfully help students place the language and the math together.
26. I know little of ELL programs and what training is available. For me, any training would be helpful.

27. Teaching teachers how to break the language barrier with the Hispanic students is the greatest need.
28. Conversational Spanish or new hires who already speak Spanish.
29. Math books in the learners' language, along with worksheets and tests.
30. Training for teachers who have ELL students in class should be included in the in-service at the start of each semester.
31. I don't know that we need so much training but we have a language that no one can translate with no resources in the language.
32. Informing teachers about how math can vary from country to country (like using a decimal versus a comma, in a number).
35. The ability to communicate with same.
36. Spanish resources and/or a person who is fluent in Spanish as well as mathematically proficient.
39. More interpreters; Spanish text.
40. Having translator for test or quizzes.
42. Our biggest problem is that we get a lot of students from Mexico who lack the basics in Math. They may not have attended Middle School. But because of their age are placed in 9th grade Algebra (our beginning math course at the h.s. level). These students don't have the basic math skills required to succeed in Algebra I regardless of the language barrier.
43. Communication >> you simply cannot talk to a student who can't understand a word you are saying.
44. Teach teachers Spanish.
45. Would help to have an assessment completed by students every 6 weeks, telling me how well I am able to get mathematics and the language communication to them.
46. More computers and programs designed for ELL.
47. I am new to this school so I am not aware of their program. Perhaps there is a need to explain the school's program to the teachers.
48. Strategies to help me communicate with my ELL students.
49. More manipulatives.
50. Helping teachers find ways to communicate with the students; finding ways to get the topics across when the teacher speaks no Spanish and the student speaks no English.
51. Using manipulatives for instruction.
52. Teachers need to have some basic vocabulary training for those words common to mathematics in language of majority of ELL students.
53. The training I received in the past was not geared towards mathematics. Having training in this content area would extremely helpful.
54. Becoming more cognizant of ELL difficulties and to compensate in planning and delivery.
55. Bilingual training.
56. Some form of tool to help those students want to achieve in math.
57. Need for more Spanish-math vocabulary.
58. Time issue. Everyone just does not seem to have the time and the training must not be good enough because we are still having trouble teaching ELL students.
59. Identifying students who need help.

60. Books written in language needed; ability to communicate to students that do not know English.
62. Math is a language in itself. Being able to translate the terms is quite beneficial to ELL students.
64. Some rigid teachers need an eye opener.
65. How to overcome the language barrier . . . How to solve the word problems when you don't read!
67. Do not see need for additional training. Think we are doing okay.
68. Finding teachers willing to get trained and take on the responsibility to deal with ELL students. A stipend for training and ELL class loads would be better since it requires more work.
69. Many teachers don't understand the time and patience that must go into working with ELL students.
70. Training teachers to work effectively with ELL students.
71. Letting teachers know which students fall in this category and what resources are available to us.
72. We don't have an ELL teacher to provide us with an assistant.
73. To help them improve their math skills.
74. Communication skills between staff and students of non-English speaking backgrounds.
75. Training that works.
76. Training for ELL students.
77. Extra time with the students. Maybe in the form of tutorials or academics. They need the extra one-on-one help.
78. Modifications for ELL students.
79. How to communicate more effectively if I am not bilingual.
80. How to modify lessons and still teach the objectives.
81. Vocabulary lists of normal everyday words, used in word problems. (ex: guide were in Pythagorean Theorem problems)
82. Easy way to use technology with students.
83. No training – smaller classes!
84. Training on how to develop a positive attitude toward education in each student, and help them to value education.
85. Training for more teachers to become ESL/ELL certified.
86. Training teachers so that they can deliver content no matter the language at least in the freshmen year so that students can acquire the content material and not lose it because of language.
87. ELL students should be in class every day, not every other day.
88. The greatest training need for enhancing mathematic instruction for ELL students is training on proper presentation of content so that the ELL student does not lose the understanding due to language.
89. Learning and teaching materials in the particular ELL student's dominant language; manuals accompany with a 2-3 day workshop on implementation.
90. Instructional tools that are not a language barrier. Books for the ELL students.
91. A working conversational knowledge of Spanish since this is the secondary language that our school population uses.

92. A good in-service that's geared to high school math teachers. The only ones I've been to are too general.
93. Obtaining resources for the ELL students to use.

Question #4: Do you think it is necessary for your school to employ an ELL teacher?

6. Yes, there should be an ELL coordinator to oversee and help teachers service the students.
11. Yes, a full time teacher.
24. Yes, we need more aides (to be in classrooms).
25. Yes, absolutely! There needs to be someone at the helm to make sure teachers are going to training and applying their skills.
28. Yes, one certified in Mathematics.
32. Yes, our Hispanic immigrant population is growing, fast. It is close to 40% and gaining.
50. Yes, but it should be one capable of doing the job and being bilingual – Spanish for us.
58. Yes, we have several and they help the students and teacher.
64. There needs to be a person who tracks and counsels these kids.
65. Yes, but more important we need ELL aides in the classroom.
69. No, I believe that regular teachers can do it.
75. Yes, I think they need one for each discipline and subject.
87. Yes, some students and teacher need that extra help.

Question #5: Have you received any training or professional development in working with ELL students?

9. Yes, ½ day in-service my 1st year here, none since that I can remember.
11. Yes, we need more training and prepared materials, not just discussions. Discussions make us aware of the problem but does not help solve the problem.
15. Yes, through Educational Leadership programs, not provided by the district.
19. Will be taking some in the spring.
23. Some, most I have developed on my own.
24. Yes, ½ day small group training last year.
25. Yes, some but I don't think it was enough nor do I think it was of very good quality.
28. Yes, 2 days.
32. Yes, it was counselor specific about getting financial aid for undocumented students. This summer I went to a workshop about how to teach ESL kids.
44. Yes, six years ago – I don't remember it.
50. Yes, 2 days of SIOP training (sheltered instruction)
58. No, I am not certified officially yet otherwise I would have.
64. Yes, I am in the SIOP training with Stacy Alanzo.
70. SIOP
84. Yes, I have worked one year teaching ESL Math.
91. Yes, each year for staff development.

Question #9: In comparison to the general student population of your school, how well do your ELL students perform in mathematics?

3 = very well

2 = similar

1 = not as well

1. 3 – very well; Depends on the translation for the classroom instruction.
2. 1 – not as well
3. 2 – similar
4. 3 – very well
5. 2/1 – similar to other groups such as economically disadvantage and African-american.
6. 1 – Not as well, but not the worst either.
7. 1 – not as well; Though there is variation. One student is from Korea and does very well.
8. 2 – similar
9. 1 – not as well
10. 1 – not as well
11. 1 – not as well; Asian and Muslim students do exceedingly well. Hispanic students perform more poorly.
12. 1 – not as well
13. 2 – similar
14. 1 – not as well
15. 2 – similar
16. 2 – similar
17. 2 – similar
18. 1 – not as well
19. 1 – not as well
20. 1 – not as well
21. 1 – not as well
22. 1 – not as well
23. 2 – similar
24. 1 – not as well
25. 3 – very well; Most of the ELL students I have have excellent math skills.
26. 2 – similar
27. 2 – similar
28. 1 – not as well
29. 1 – not as well
30. 3 – very well; Very well assuming the students acquire a working English vocabulary for mathematics.
31. 1 – not as well
32. 2 – similar
33. 2 – similar
34. 2 – similar
35. 1 – not as well
36. 2 – similar; Some better, some worse
37. no answer
38. 1 – not as well

39. 1 – not as well
40. 3 – very well
41. 3 – very well; Student in Pre-Calculus
42. 1 – not as well
43. 2 – similar; They are similar or below the African-American population.
44. n/a
45. 3 – very well; If they work at completing assignments and coming to tutorials for one on one help.
46. 1 – not as well
47. I do not know
48. 1 – not as well
49. 2 – similar
50. 1 – not as well
51. 2 – similar
52. 3 – very well
53. 2 – similar
54. 1 – not as well
55. 1 – not as well
56. 1 – not as well
57. 2 – similar
58. 2 – similar
59. 2 – similar
60. 2 – similar; with a few exceptions
61. 2 – similar
62. 2 – similar; Though they do not perform as well as the white population they do perform better than the black population.
63. 1 – not as well
64. 2 – similar
65. Asian – similar; Hispanic – not as well
66. 1 – not as well
67. 2 – similar
68. 2 – similar
69. 2 – similar
70. n/a
71. n/a
72. 2 – similar
73. 2 – similar
74. 1 – not as well
75. 1 – not as well; Language barrier
76. 2 – similar
77. 1 – not as well
78. 1 – not as well
79. 2 – similar; when I have one . . .
80. 2 – similar
81. 1 – not as well
82. 2 – similar

- 83. 1 – not as well; Not as well on standardized tests. If they have had math in their country the do as well.
- 84. 1 – not as well; with some exceptions
- 85. 1 – not as well
- 86. 1 – not as well
- 87. 2 – similar; Reason they do similar is most teachers translate for our kids.
- 88. 1 – not as well
- 89. 1 – not as well
- 90. 1 – not as well
- 91. 1 – not as well
- 92. 2 – similar
- 93. 1 – not as well

Question #10: Are you aware of the kinds of instructional and assessment modifications that should be used in order to make your lesson content comprehensible to your ELL students?

- 7. There is always more to learn.
- 8. Kind of, but would like more training.
- 26. Mostly – I know that teaching in their language is not going to help them in learning English. But it's a common sense approach.
- 32. Not specifically for math. My ESL training this summer was more of an overview.
- 48. This would be beneficial.
- 50. I know some, but not many – not enough to be successful with them.
- 62. I am aware of some modification but not all.
- 78. Some, I am aware of some modification.
- 87. Since we deal with high number of kids (ELL), common sense dictates the help we offer.
- 90. I have been told writing more instead verbal instruction is better.

Question #11: Would you support extended day opportunities for ELL students so that they can receive help with their schoolwork and/or participate in extracurricular activities?

- 6. I don't know. Why can't they participate in extra-curricular activities now?
- 9. The problem is that many of these students must hold a job to help with family expenses.
- 24. I would support the idea, but would be unable to work an extended day.
- 28. If taught in their language.
- 32. As long as it's funded.
- 43. We do have after school ESL tutorials.
- 44. Yes, if learning English is the main goal.
- 45. Yes, They already have 45 minutes available in the morning and 15 minutes in the afternoon to get help from me/
- 47. What do you mean by support? Do you mean I would be in charge?
- 48. We do offer tutoring daily,
- 62. So long as they do not sit idle in class expecting to do nothing since they'll be coming after school to get "help".

- 64. Where would it come from? Extended day take manpower – a lot (most) of these kids can't stay after school.
- 69. I spend time after school working with the students.
- 78. If the programs involve only small groups, then the program will be successful.
- 83. But many of them work.
- 87. Here at school we help ELL students to the full extent.
- 92. They already have those opportunities at my school.

Question #12: Would you encourage training on designing alternative assessment tasks and a meaningful assessment plan that uses a diversity of assessment measure to assess ELL students.

- 5. I think they need to test like the other students. They do not get diversity of assessment on their jobs that many of our ELL students hold while in school.
- 6. Unfortunately, they cannot graduate high school without taking a standard TAKS test in English.
- 9. Not unless I receive specific training in Math, every training I have ever received has always been based in another subject area and I was told to figure how to apply it to Math – don't have time!
- 24. Alternate assessment would further isolate and accentuate the students differences from others – “fitting in” is important to the student.
- 25. If the assessment does not “dumb-down” to the students then it is fine.
- 30. If students are attending a school that conducts it's classes in English, the student should have translations available of the same work required of the other students.
- 36. Yes, but I want it to be applicable, usable info –not just a bunch of theory and process thrown at us.
- 43. Yes, although I feel this more to overload teachers.
- 44. Only in the beginning.
- 64. It is hard to diagnose a language problem compared to a learning problem.
- 75. TAKS does not allow for it.
- 83. Exemption for years (more than one), but allow them to test.
- 87. I feel we should have same assessments as other students. Only of teachers are English speaking only.

Question #13: Would you support creating a teacher academy to provide rigorous professional development to teachers of ELL students with a goal of introducing best practices into mathematics classrooms?

- 6. If it is taught by actual high school math teachers. Others don't understand our needs.
- 9. As long as it was in Mathematics, not another subject area.
- 11. I think it is necessary! ELL students are at a severe disadvantage.
- 24. Rigorous? Doesn't sound teacher-friendly.
- 25. Well prepared teachers = well prepares students. I believe this.
- 47. Just an in-service.
- 83. What works for ELL generally works for all.
- 87. Only if teachers are English speaking only.

Question #14: Are you interested in participating in a teacher focus group where the focal point will be to identify and discuss secondary mathematics teacher’ training needs for enhancing the effectiveness of mathematics instruction for ELL students?

7. Must be no out-of-pocket.
9. I currently do not have the personal time to do this.
24. Interested but unable to travel out of town (except on Thursday)
32. Most of time is spent as a counselor, but someone else at my school might be.
57. I am a coach and would not have time for this.

Question #15: Are you interested in participating in a week long summer institute where the focus will be to provide teachers with effective teaching strategies and materials for teaching ELL students?

7. Must be no out-of-pocket
9. Again, only if it is based in mathematics and NOT another subject area.
11. The summer institute would be difficult to attend because I have small children of my own. If the institute provided child care I could attend.
24. I teach summer school, but it’s a good idea.
25. I may have schedule conflicts but yes, I would be very interested.
32. I’ll be a full-time counselor next year, most likely, so it probably is not worth the trouble for me.
42. Depending on the cost and when during the summer.
48. Maybe. The institute would have to provide realistic practices that will help my LEP students.
50. Giving up a week in the summer is difficult as I teach half of the summer.
57. I work in the summers.
70. I would love to do this. However, not the summer of 2005 because I’m completing my master at this time.
71. I don’t teach any of these students.
83. I’m teaching ELL learners in summer school.
90. I think it would be helpful to learn how to better teach ELL students.

Question #16: If you could change one thing about your school’s approach to educating ELL students, what would it be?

1. Approach is well intended, but there is always a lack of people and skills for implantation.
2. Having someone on our campus that could work with our ELL students more frequently.
3. I think ELL students that have a lot of difficulty in a regular classroom should be enrolled in separate ELL classes for each subject.
4. Diagnosing students’ ability level in mathematics at the beginning of school year without any language barrier factor. Students would benefit more with a program that would fit their academic needs. A program that can bridge the gap and offer better opportunities to integrate into a new system.

5. Have training made available for those interested in this area and feel they would benefit in their interaction with their students.
6. I wish that there was one particular staff member to look out for and watch out for these students. Right now it seems that they are dropped in the water and expected to swim on their own.
7. In class peer tutors (perhaps bilingual seniors who excel in Math).
8. That students are all the same. People learn differently and ELL students do need modifications.
9. A specific math model class taught by an ESL certified (and Spanish speaking) teacher. Just being trained in ESL is often not enough.
10. Force the students to learn English instead of giving them a Spanish-speaking teacher.
11. I would insist the school take a more proactive roll to help these kids. Regular Ed teachers need to be aware of who the ELL students are and the ELL students need to be with teacher who are willing and able to help them.
14. Educating all teachers on basic strategies that are proven successful in teaching ELL students.
15. More communication between teacher and ELL teacher.
16. Full time access to a Spanish speaking instructor.
19. Having a better trained staff with a better plan of attack.
24. Instead of spreading new immigrants all over the day, group them in one class period. That way alternate methods of teaching/assessment would be easily implemented w/o accentuating their inability to understand traditional methods. Also, support staff could be better utilized.
25. I would change the idea that ESL students don't get as much support in the classroom as, say, special needs students. There is somewhat of a sink-or-swim approach. This is not because there is no desire on administration nor am I saying this is the case. I am simply saying that placing these students in the hands of untrained teacher may or can ultimately hurt them.
26. I'd make teachers aware of the need for this type of program.
27. We need Spanish speaking aides that could assist students that have trouble understanding.
28. Group ELL together in classes and hire language aides to interpret instructions and assist in work often instructions. Probably cost prohibitive.
29. Just provide home language text.
30. Having an ELL trained employee assist in a normal classroom setting for the students who are streamlined into regular classes.
32. Attitude. Our recent immigrants are part in a program called "Newcomers". It's like a school within a school. Teachers barely interact with them so they kind of seem unimportant. They are forgotten for the most part.
35. Training that is not a burden to my other duties and activities ie, let the state monetary action to provide training and quit making the "teacher" the "goat" in these situations.
36. Resources for them to utilize, including teachers with varying academic knowledge, not just ELL certification.
39. Design more activities where ELL students mix with non-Spanish speaking students. Limit amount of social contact between ELL students.
40. Just having a translator on tests and quizzes.

43. We have a large number of ESL students and only one small ESL classroom. Also, I am very frustrated by ESL because the students take advantage of it. They can speak perfect English but refuse to in the classroom and I do not feel comfortable with students speaking another language and me not being able to know what is said. I think this is unfair and causes major disruptions in the classroom. It is very hard to prove when a kid can or cannot speak English when they are playing games to get out of work.
44. Not familiar with our approach.
45. More instruction for the ESL teachers in Mathematics curriculum of geometry. This course requires an extensive understanding of terms and definitions for the students to be successful.
48. I would prefer to have my LEP students in one group. If I have a room full of students with the same needs, I can serve the individuals better and at the same time serve the group as a whole. The resources they bring will also help in communication.
49. Better pay
50. We need to do more grouping with them. I believe they need to be together in classes as much as possible – to help each other and to better allow for sheltered instruction. We tend to spread them out too much.
51. I think our campus could use more support staff to help our ELL population.
52. See question 1
53. More one on one help for the students.
55. Work with them during the summer to help improve their communication skills.
56. Change the attitude of the student to the parent and then to the school that math is needed by all and that coming every day is the most important thing in that students life.
57. Hold these students to the same rigorous standards set for other students after they have been in the ESL program for 2 years. Also, help teachers by having in-service to increase our Spanish vocabulary and educate us on teaching strategies for ELL students.
58. My school is trying to get everyone certified so the only thing is to get more training before we go take the test so we can be more prepared in teaching ELL students.
60. To somehow have students at least be able to ask questions and understand what I am saying when they get to me.
62. That the expectations should never be lowered for ELL students.
64. Better attitude by that handful of teacher who won't have an open mind.
65. Teach them all the subjects with the same teacher. Once they learn the language they can get a normal schedule.
67. Again, I think we have a good program in place.
68. Put more funding towards translation, ESL aides and more faculty to have smaller class sizes. I would also encourage the district to offer stipends for teaching willing to get training and willing to spend the extra time teaching ELL students.
69. I would make sure that students are given the appropriate time and instruction during school and after as necessary.
70. Teachers need to understand that standing in front of a room and delivering a lecture is not effective instruction. Teaching by providing hands-on activities which I do,

- requires enormous investment of time and energy. I would like some teachers to recognize that this is an excellent investment.
72. Have an ELL teacher for them – not get the Spanish teacher to help out in his spare time.
 73. Some of the ELL should be provided with instruction in their own language until they are fluent enough to learn in an English speaking classroom.
 74. Students should understand the importance of English in a school in the US. Just from a practical point of view, if my language was not native to the region of the world I lived in, to be a successful teacher and productive citizen I would need to learn the language.
 75. Get more training, practices, and strategies that work.
 76. More training.
 77. I wouldn't place them all in one classroom. I would mainstream them and give them the extra help after school and Saturdays.
 78. Have more meaningful training on successfully educating our ELL students.
 79. I think our students are well served. I find them to be successful as they go through our ESL program.
 80. More realistic training.
 81. We have one person for three campuses. I would like to see one instructor for each campus.
 82. Students have shown some trouble when they come out of the program. I believe they can only stay a couple of years then they have to be pulled out.
 83. Smaller classes.
 84. I wish teachers had more time to carefully consider the needs of each ESL student. Also I wish we had translators available for parent communication.
 86. More support to identify ELL students and place them in classes where they can be helped by teachers that are bilingual and bicultural; more resources in Spanish books, etc.
 87. I feel we do a good job at our school. Our thing I would change would be our Algebra schedule for these kids (ELL). They should have math every day.
 88. I would like to see more support for the teacher and for the students. Also, more resources, for the students can have an opportunity to enhance their ??? of their second language.
 89. Homogeneous grouping.
 90. Having more bilingual teachers teaching secondary mathematics.
 91. It is too hard to have one student who is ELL in the classroom. If there are to be some then it would be easier work with a larger group (5-6) in a class.
 92. I would like to see sheltered math classes for those in this country less than one year.
 93. Maybe placing the ELL students in a class as a group instead of spreading them around different classes.

ADDITIONAL COMMENTS:

1. I am new to the district, so possibly unaware of things offered here. I feel that PAISD had much more offered for ESL, but also had a higher percent of ESL students.

4. I have been teachers for 7 years and I've had the privilege of working with these types of students. I have given a great commitment for the advancement and integration to these students. I truly feel that these students can be successful and perform just as good or in many cases better than your average English speaking students. One of the major reasons why students have been very successful after being through my instructional experience is because I focus on teaching them via their own language; I gradually incorporate more English communication as we go. All classroom (math) terminology is translated to Spanish all the time.
- 5 I am interested in there being training available for those who want to be a part of such training – I would be one of them – but do not think this should be a requirement at this time.
6. Most good teachers make different types of medications for all students – special ed, GT, and ELL, plus any other. We have less than an hour with twenty or more students of all types except perfect. There are students whose transcripts say they have taken two years of high school math, yet they have never seen an algebraic expression. The language is not as much of a barrier as the education deficiency.
7. I would be interested in learning about Math instruction in Mexico – in other words, what was it like from there they came; Perhaps implement some of their practices.
9. My main problem is that all ESL or ELL training I have ever received had been based in the subjects of Language Arts, History, and/or sciences. Never in Mathematics. When I asked the presentors about the applications in my subject area, I always received a run around and was eventually told that I would have to figure it out. I do not have the time to do this!
11. Do not put ELL students in class with teachers who are from other countries. Their English is hard to understand for English speaking students! Can you imagine how difficult it must be for ELL students to understand those teachers?
24. Older students (meaning been in country longer) seem to be successful in math once the language is mastered. Several former ESL students have said that too much “babying” from ESL teachers hindered their learning in traditional classrooms. They preferred “learning the hard way”.
32. I definitely think math teachers could use some strategies for working with our ESL kids. So many presenters are math-phobic that math is ignored.
36. It doesn't help these kids much to have a teacher who is ELL certified but not competent or even comfortable with mathematics, especially in the secondary classes. The classroom teachers struggle with the language barrier and the ELL teachers struggle with then math process and concepts so often we end up not helping them very much overall.
42. But, because of their age, they are placed in 9th grade Algebra (our beginning math course at the high school level). These students don't have the basic math skills required to succeed in algebra I regardless of the language barrier.
62. I am a Hispanic math teacher who is not ELL certified. For this reason, I get a great majority of ELL students in a regular class. I agree that placing the students in my class provides some benefit. However, the greatest benefit would be if I was given all ELL students in one class as opposed to having half of the class ELL and the other regular.

73. As a classroom teacher at the high school level, most of the students that are classified as ELL have a working knowledge of the English language and can do well in class. The training that is most needed is for those that have recently come to the US and are really struggling to learn the language. These students really need to have an instructor in their primary language which our school does not offer.
83. Resources need to be directed to smaller class size.
86. Del Valle has a large population (and increasing) of students that are recent immigrants, and need to be saved. Content should be given in their own language at least their freshmen year while they begin acquiring the English language.
88. ELL students are a special population that at times tends to be overlooked. We need to address their needs just like we would all the special population groups, such as gifted and talented.
92. I teach Pre-Advanced Placement and Advanced Placement Math classes. My ELL students are very motivated and have friends in class who they work well with.

Appendix C: MELL Focus Group Protocol

Personnel

- One or two facilitators who will nurture the process, but not participate. A facilitator will provide a 10-minute introduction, ensure that the group adheres to the schedule, focus lines of questions, ask for clarification of responses when necessary, and conclude the session with a summarization of the group's discussion.
- Five to eight secondary mathematics teachers

Supplies and Equipment (some optional)

Tablets, pencils, pens, bottled water, hard candies
Three flip charts, multiple colors of felt markers, adhesive tape
Nametags for participants and facilitators
Recording device and audio/video tape

Role of the Facilitator

- Collect useful information to meet the goals of the meeting (most important of all roles)
- Record the session and keep track of time. **If you use 60-minute recording tapes, please remember to change tapes after 60 minutes.**
- Carry out the agenda
- Carefully word each question
- Take notes on the flip chart (and in a personal notebook if necessary)
- Ensure all teachers are participating in discussions and that participation is evenly distributed. This is why nametags are so useful. If the same people seem to be dominating the conversation (or if some people are not participating in the conversation), then ask for opinions – perhaps by going around the table to ask each person to contribute a thought/opinion on a given topic.
- Close the session.

Procedures

Facilitator(s) Setup Duties (20 minutes prior to beginning focus group)

- Position the flip charts in convenient places throughout the room.
- List each question on the second page of a flip chart. It is important that the participants do not see the questions until the session actually begins.
 - Question #1 - What is good about professional development for teachers of English Language Learners in Texas?

- Question #2 – What aspects of professional development for teachers of English Language Learners in Texas need improvement?
- Question #3 - What do you believe are the greatest professional development needs in Texas for enhancing mathematics instruction for secondary English Language Learner students?
- Meet and greet the participants
- Provide each participant with a notebook and pencil and/or pen
- Because we want all participants to be comfortable and relaxed, it also may be wise to have either bottled water for each participant or a pitcher of water with plastic cups. Hard candy is sometimes helpful if throats become dry while brainstorming.

Introduction (10-15 minutes)

- Start the recording device.
- Thank participants for participating and introduce yourself as the facilitator of the focus group.
- Explain the means of recording the session and assure the participants that the recording will not be viewed by anyone other than the researchers.
- If you have not already done so, ask each participant to complete a Lamar University Request to Pay Vendor (RPV) form and human consent form.
- If you choose, have each participant briefly introduce him/herself.
- Briefly review the structure of the focus group. (You can say ... We will meet for 1.5 to 2 hours today. My intentions are to introduce three questions for group discussion. It is important that everyone participates in the discussion through brainstorming, building on one another's comments, agreeing or disagreeing with one another, discussing personal experiences with students and teachers, etc... I have three ground rules: 1) Stay focused on the task that we are trying to accomplish; 2) Maintain momentum, and; 3) Achieve consensus on the best responses to the questions.)
- Briefly remind the audience of the purpose of the session. (You can say ... As we are all aware, the achievement gap in mathematics between the English Language Learner (ELL) student population and non-ELL student population demands action. The Texas State University System (TSUS) is part of a major funding effort to identify secondary mathematics teachers' training needs for enhancing the effectiveness of mathematics instruction for ELL students. The grant involves five TSUS universities and has a monetary value in excess of \$1,000,000. Our goal is to develop and provide a series of resources for secondary teachers of ELL students throughout the state of Texas, improving ELL student proficiency in the area of mathematics. We hope that the data that we gather from this focus group will significantly impact training needs for teachers.)
- Emphasize that your role is merely that of a facilitator because you want this to be more of a discussion among participants, not a lecture or revelation of your thoughts. Hence, all participants should keep the conversation going (as we know teachers can easily do).
- Ask if there are any questions before you begin.

Phase I (45-60 minutes)

- Introduce the three questions by removing or flipping the first page of each flip chart.
- Ask participants to brainstorm about the questions (5 minutes) with the intent of helping us identify training needs for teachers of ELL students.
- Begin with question 1 (although it is likely that responses will often address all three questions). Ask someone to begin the discussion on question 1.
- When you feel that an opportune segue to the next question presents itself, introduce the next question.
- Record comments on the flip chart under the respective question. As more comments are added, it will likely be necessary to tape a full page to the wall and continue writing comments on the next page. Please number pages. For instance, comments for Question 1 may be labeled Q1-P1, Q1-P2, etc...

Phase II (30-40 minutes)

- Ask participants to review the questions and the recorded information on the pages on the wall.
- Ask participants to rank the top five items for each question – go for consensus. Summarize all information gathered.
- As participants agree on the top five items, transfer the top ranked items to clean pages on the flip charts.

Phase III (10 minutes)

- Ask for any final thoughts, was this session helpful, etc...
- Thank participants again for coming and answer any final questions. They can call Dr. Richardson with any questions.
- They will receive their stipends via mail as soon as the paper work is processed at Lamar University.

Facilitator Post-Focus Group Task

Gather recorded tapes.

Gather notes made on flip chart. Put them in one pile.

Gather any of your written notes (clarify any scratching, ensure pages are numbered, etc...)

Write down any observations that you made during the session that you did not record.

Contact either Sandra Richardson Richardson@math.lamar.edu or MaryE Wilkinson Wilkinson@math.lamar.edu to finalize data pickup arrangements.

Appendix D – Participants’ Comments for the Secondary Mathematics Teachers’ Training Needs for ELL (English Language Learner) Instruction Focus Groups

Transcription of Information Written on Flip Charts During the Focus Group Sessions

Southeast Texas Group-FG1 Beaumont, Texas

First Question:

Q1 What is good about ELL PD in Texas?

Working Comments:

1. TexTeam training.
2. Technology conferences.
3. Algebra Institute w/ Dr. Reeves at Orange (acquire new computer programs).
4. Enhancement vs. remediation.
5. District inservice very useful – learn new ways to teach geometry.
6. Training on using visual representation.
7. Limited ELL PD training in Beaumont – focus is language arts not math.

Final Comments:

1. General PD is available and results in some improvement of teachers.
2. Some training does include visual representations, manipulation,
3. Offering of “classroom Spanish” sessions.

Second Question:

Q2 What aspects of ELL PD in Texas need improvement?

Working Comments:

1. Teachers with ELL students in content area are generally not master teachers.
2. LAT training at Region V – lack of training/materials; expect teachers to provide it; training is not definite; too little too late.
3. Training not specific to mathematics.
4. Have math ELL students in one class.
5. No notices of general PD – teachers must look them up on computer. Region V sends out bulletin with list.
6. Some inservice during school hours.
7. Need experienced teachers to preside over PD sessions.
8. No bilingual program at secondary level.
9. Some type of cross-district training with similar demographic districts.

Final Comments:

1. Existing professional development programs should address mathematics specifically.
2. Multi-district professional development (similar demographics).
3. Professional development for proficient math teachers should include stipends.

Third Question:

Q3 What do you believe are the greatest PD needs in Texas for enhancing mathematics instruction for secondary ELL students?

Working Comments:

1. Assistance with accountability issues.
2. Transcript review for admission to community of Texas math teachers.
3. Reading in the content area.
4. Focus of ELL.
5. Math teacher must depend on the one ELL specialist in the school.
6. No PD for math/ELL.
7. No “new comer” center group (cohort groups) in regular classrooms.
8. Require Master Mathematics Teacher to teach ELL incentives.
9. Program for ELL teachers.
10. Real strategies to use in a class.
11. Whole campus.
12. Math/science block.
13. Where is funding for support?

Final Comments:

1. Bilingual certified math teachers.
2. Better communications about available PD for secondary math.
3. Standardization of professional development for classroom math teachers across Texas.

**West Texas Group-FG2
Alpine, Texas**

First Question:

Q1 What is good about ELL PD in Texas?

Working Comments:

1. Need professional development. Participants had no response. No ELL training provided by school districts or Region 18 Service Center.
2. Principal/Administration needs to provide literature and/or web sites for ELL training.
Note: Valentine I.S.D. did provide some ELL literature.

Final Comments:

The group did not feel that Final (or revised) Comments were required for this question.

Second Question:

Q2 What aspects of ELL PD in Texas need improvement?

Working Comments:

1. Math needs for ELL teachers:
 - a. Math vocabulary
 - b. Technical aspects of mathematics
2. Identify and address problem:

- a. Is it math?
- b. Is there a language barrier?
3. Training on meaningful hands-on activities and calculator activities.
4. Need information on second language acquisition – brain research.
5. A class which would include alternate assessments.
6. Training in pedagogy in the technical register of mathematics.
7. Training on communicating with ELL parents (culture).
8. Cultural sensitivity training.
9. Training in mathematics technology systems.

Final Comments:

The group did not feel that Final (or revised) Comments were required for this question.

Third Question:

Q3 What do you believe are the greatest PD needs in Texas for enhancing mathematics instruction for secondary ELL students?

Working Comments:

1. Spanish/English math vocabulary.
2. Training in assessment of math skills.
3. Cultural sensitivity training.
4. Training on cooperative learning with existing bilingual resources.

Final Comments:

The group did not feel that Final (or revised) Comments were required for this question.

**Central Texas Group-FG3
San Antonio, Texas**

First Question:

Q1 What is good about ELL PD in Texas?

Working Comments:

1. SIOP training (at least addresses the issue).
2. Training for GT ESL students (multi-discipline training).
3. General training/sensitivity.
4. ELL training for specifically ELL staff (regarding laws, etc...).
- * Very little training specific to mathematics (training years ago or not at all or general training).

Final Comments:

1. SIOP – Expand upon techniques that can be directed at mathematics.

Second Question:

Q2 What aspects of ELL PD in Texas need improvement?

Working Comments:

1. PD for mathematics teachers to become ELL specialists (middle school).
*Mathematics Register
2. Mathematics as the language of science.
3. ELL PD for any mathematics teacher.
4. Yearly sessions for the full staff.
5. The brain-based approach to how different age students learn.
6. Give specific techniques to help new ELL students.
7. Communications between ELL specialists and the rest of the staff early each year (sharing classes).
8. External experts.
9. Combined training.
10. No “emergent” class for math.

Final Comments:

The group did not feel that Final (or revised) Comments were required for this question.

Third Question:

Q3 What do you believe are the greatest PD needs in Texas for enhancing mathematics instruction for secondary ELL students?

Working Comments:

1. Training for reading in content area.
2. Give specific techniques to help new ELL students.
3. Strategies/sessions specifically for math.
4. Deeper learning of content/foundational material.
5. Training that separates learning language from learning mathematics.
6. Training that suggests strategies for students at different levels.
7. Training on cultural differences that may be statistically common.
8. What math is taught in other countries?

Final Comments:

1. Provide specific math techniques that assist students at different levels of English proficiency, including new to experienced learners.
2. Specific training that incorporates cultural differences and country specific curriculum.
3. Specific techniques for teaching reading in content area, including real life applications.

**South Texas Group-FG4
Brownsville, Texas**

First Question:

Q1 What is good about ELL PD in Texas?

Working Comments:

1. Elementary (general) for self-contained.
2. Group of teachers who speak both.
3. ESL teachers get variety of methods of teaching.

Final Comments:

The group did not feel that Final (or revised) Comments were required for this question.

Second Question:

Q2 What aspects of ELL PD in Texas need improvement?

Working Comments:

1. Don't jump around programs (10 days ESL Strategies for middle and high school teachers)(60 teachers \$100 per day)("3 domains" generally only 1 year)
2. Ask teachers!
3. Look at the research for what works for all students.
4. Work to change teachers' and the community's attitudes.

Final Comments:

The group did not feel that Final (or revised) Comments were required for this question.

Third Question:

Q3 What do you believe are the greatest PD needs in Texas for enhancing mathematics instruction for secondary ELL students?

Working Comments:

1. Content specific training (MATH!)
2. All teachers extended for willing.
3. Do activities that are known to work. Ex: Simple tricks for work problems. "more than"; "less than"; read backwards; Underline
4. Training to help students make the connections between languages.
5. Time periods for ELL students that are extended.
6. Summer (right before start) plus monthly or bimonthly.
7. Support group (email or telephone).
8. Presentation by teacher from Mexico.
9. On going hours (endorsement)(like a certification).
10. By specific topic (Ex: Algebra) to train to use visual approach.
11. Sometimes the "silly" things are what work and stick.
12. Resource based training.
13. Teachers training teachers.

Final Comments:

1. Content specific ELL mathematics training to help students make connections between languages.
2. Teachers (Expert ELL Mathematics) using proven research based methods in a summer workshop (just before school) plus monthly of bimonthly support group meetings (?).

Appendix E – Excerpts from *A Summary of Professional Development Models Used in the State of Texas*

A report prepared at Texas State University- San Marcos (Fischer, et. al., 2005)

Cognitively Guided Instruction

Origination: The research-based approach was developed by faculty at the Wisconsin Center for Education Research, University of Wisconsin-Madison. Originally developed and tested in Madison, WI and the surrounding area, this program has been replicated in many parts of the United States.

Implementation: Cognitively Guided Instruction (CGI) is a professional development program for teachers that explicitly shows what kind of knowledge students bring to the math learning process and how they connect that knowledge with formal concepts and operations. This one-week institute on how children learn mathematics was designed for teachers of students in grades K-3. The CGI approach focuses on student knowledge and encourages teachers to pose story problems that can be solved by any means chosen by the child. Problem-posing and problem-solving become the foci of the mathematics class, rather than the traditional emphasis on recall of number facts and memorization of algorithms. Cognitively guided instruction is a problem-solving mathematics program for students in Kindergarten through third grade. This strategy is not textbook specific and has been proven effective for boys and girls of diverse social class, racial and ethnic, and language proficiency backgrounds.

Philosophy: Participants explore the principles and methods of Cognitively Guided Instruction (CGI) and enhance their understanding of mathematics content. CGI is an approach to teaching mathematics in which children's knowledge is central to instructional decision making. Teachers use research-based knowledge about children's mathematical thinking to help them learn specifics about individual students learning and processing styles. Participants will spend time learning how children think about mathematics and how they solve authentic and interesting problems. Follow-up is available through an on-line course and additional advanced training to assist in implementing CGI principles in the classroom.

Connected Mathematics Project

Origination: Connected Mathematics Project was developed at Michigan State University.

Implementation: There is a 63-page implementation guide written by the author's of CMP. The guide gives an overview of the curriculum and materials, discusses teacher issues, discusses district issues, and outlines a recommended three-year implementation plan. It completes the model by giving a brief outline of effective professional development and advocates building A Long-Term Professional-Development Plan.

Philosophy: Experience and research suggests that effective professional have some common characteristics. To be effective, professional begins prior to curriculum implementation and continues years of implementation; is centered on the standards-based that will be/has been adopted; develops teachers' knowledge pedagogy; models and reflects good mathematical pedagogy; concerns about change; involves teachers in reflecting and improvement; creates strong leadership; includes a plan they join the district; reflects strong support from administration establishes a "community of learners" among teachers.

Everyday Math

Origination: Research-based curriculum developed by the University of Chicago School Mathematics Project (UCSMP) in 1983.

Implementation: UCSMP utilizes their publisher, the Wright Group, a subsidiary of McGraw Hill, to provide professional development to accommodate EDM implementation. Some options include Onsite Professional Development which customizes professional development for a particular district. The district can choose one-day or multiple days of professional development workshops or have sustained professional development workshops through a menu of workshops. Onsite Follow-Up Support is also available with services including classroom observation to accompany and follow up on the workshops. Contracted workshops can be provided through EDM presenters, usually working with a maximum of 30 teachers.

Philosophy: Increasing the mathematical knowledge and competence for today's school population requires bold initiatives...UCSMP reflects these initiatives through an enriched curriculum for the elementary grades. EDM encourages teachers and students to explore more of the spectrum of mathematical ideas through a deeper understanding of key mathematical concepts and an in-depth study of all the strands of mathematics.

Family Math (EQUALS)

Origination: Family Math is currently housed at the EQUALS Program at the Lawrence Hall of Science on the University of California campus at Berkeley, California.

Implementation: There are 3 types of workshops: 1. The Family Math Class Leader Workshops prepare educators, parents, and others to lead classes for families (For this kind of workshop, people with less mathematics experience are encouraged to team with someone who has more math experience), 2. Family Math Staff Development Workshops prepare experienced Class Leaders to organize and offer class leader workshops (For this kind of workshop, presenters need to have a good background in math), and 3. Custom designed workshops train school personnel on how to present ways to think about math for a particular school setting in order to guarantee student success in mathematics (These workshops are produced by teachers, counselors, and administrators, designated as the EQUALS academic staff).

Philosophy: Family Math believes that all children can learn and enjoy math and that parents and other family members are their children's first and most influential teachers. Many parents report that they do not know how to support their children's mathematical learning. Family Math focuses entirely on families learning math together. These families reflect a diversity of composition, ethnicity, gender, language, and economic stature. In Family Math, mathematics becomes a challenging and engaging learning experience for everyone. The materials are designed to provide all parents with clear and practical advice, active participation tools, and solid math and science problem examples.

Figure This! Math Challenges for Families

Origination: Figure This! was developed as a joint project by the National Council of Teachers of Mathematics, the National Action Council for Minorities in Engineering, and Widmeyer

Communications with support from the National Science Foundation and the U.S. Department of Education.

Implementation: To start using Figure This! Math Challenges for Families, a parent, teacher, or administrator need only have internet access. The challenges are available free of charge from the Figure This! website. There are introductory materials including slide shows with notes available to present at a family night or PTO meeting. Additionally, sending available letters of introduction home to parents completes the limited information available on or necessary for implementation.

Philosophy: Mathematical challenges for families provide interesting math challenges that middle school students can do at home with their families. Each challenge features: a description of the important math involved; a note on where the math is used in the real world; a hint to get started; complete solutions; a "Try This" section; additional related problems with answers; questions to think about; facts related to the math; and resources for further exploration.

Investigations

Origination: Investigations in Number, Data, and Space was developed at Technical Educational Research Center (TERC) by a team of curriculum developers and mathematics educators. TERC is a nonprofit research and development organization whose mission is to improve mathematics, science, and technology teaching and learning. TERC, founded in 1965, is located in Cambridge, Massachusetts.

Implementation: The Investigations for Transforming Mathematics project, developed at TERC, offers the only Investigations professional development created by the authors of the Investigations in Number, Data, and Space curriculum. Investigations Professional Development sponsored by TERC includes the Investigations Implementation Center which provides Investigations Implementation Institutes and the Annual New England Investigations Conferences, also known as the Investigations User's Conference. Investigations Workshops for Transforming Mathematics consists of five-day workshops in different locations across the country. The Investigations Implementation Institute is a three-day institute designed for teams from schools and districts implementing Investigations curriculum. The Annual New England Investigations Conference is a one-day conference for teachers and administrators using the Investigations.

Philosophy: The Investigations program embodies the vision of the rigorous national standards for mathematics developed by the National Council of Teachers of Mathematics (NCTM). Investigations is based on an extensive body of research on how students learn mathematics.

MATHCOUNTS

Origination: Current curriculum and problems are developed by local NCTM chapters and National Society of Professional Engineers.

Implementation: To start a local MATHCOUNTS program, there is available a School Kit. The School Kit includes everything needed to start a successful school program. Veteran coaches provide the training offered free of charge, and include free materials. Cost for workshop facilities are sponsored by local businesses.

Philosophy: MATHCOUNTS motivates and rewards students by fostering teamwork and a competitive spirit. It is more than a competition. It involves students and teachers in year-long

coaching sessions and helps students at all levels improve their problemsolving skills. MATHCOUNTS builds math skills, promotes logical thinking and sharpens students' analytical abilities. MATHCOUNTS provides America's middle school teachers with creative, state-of-the-art curriculum materials, free of charge. MATHCOUNTS introduces students to math-related careers through contacts with engineers and other professionals who serve as volunteers. MATHCOUNTS is educator-driven. Materials and activities are structured to meet student needs, as identified by educators. Members of the National Council of Teachers of Mathematics (NCTM) develop these materials in accordance with NCTM curriculum standards.

Mathworks

Origination: Research-based curriculum and professional development model developed at Texas State University-San Marcos beginning in 1996.

Implementation: The training begins with a two-week course of professional development. Teachers observe a math camp in the morning taught by master teachers. In the afternoon, the new teachers take a graduate course that links theory to practice, and covers the content and pedagogy being delivered. Teachers may participate in successive summers to observe different levels of the curriculum, and take further graduate courses that lead to a masters in middle school mathematics teaching.

Philosophy: All students can learn mathematics at a high level if given the proper background and training. Mathworks encourages students and teachers to learn the language of algebra early, with an integrated curriculum that addresses state and national standards.

NCTM Navigations

Origination: Developed by various groups under the auspices of the National Council of Teachers of Mathematics (NCTM). Navigations is a collection of supplementary mathematics books for teachers. These are a resource for teachers that are intended to help teachers make mathematics fun for students, while covering key ideas from the NCTM Standards.

Implementation: Training is conducted on-line through E-workshops. The idea is to provide for a free flow of ideas between participants, who will share ideas about what works best, what doesn't, and why.

Philosophy: Navigations is intended to help teachers by providing activities and problems that cover the Standards.

Sharon Wells

Origination: This model is currently in use by 180 districts in Texas. It is designed specifically for Texas by Sharon Wells, a former Texas teacher, who taught for 28 years in Texas at Brownsville and Lubbock schools. The program originated in Brownsville in 1993.

Implementation: Sharon Wells Math is designed specifically for Texas educators by a former Texas teacher with step-by-step guidelines for classroom implementation. This spiraling curriculum is developed for Grades 2-6, with 2-5 also available in Spanish. These levels are inserted in the grade specific curriculum, which is aligned to the TEKS and addresses tested areas of the TAKS. All grade levels include a focus on problem solving strategies, graphing

skills as required by grade levels, basic facts or review activities, and the use of manipulative materials in a problem-solving format to teach content knowledge.

Philosophy: Sharon Wells Math is a conceptually based spiraling curriculum that is geared towards the development of student problem solving skills and abilities. The curriculum is designed to provide opportunities for students to actively engage in learning, to offer students challenges, stimulation, and support, and to prepare students for an ever-evolving future.

Sheltered Instruction (SIOP)

Origination: A research grant funded through the Office of Educational Research and Improvement's Center for Research on Excellence, Education, and Diversity (CREDE). The center has researchers at twenty-six institutions across the US.

Implementation: The SIOP Model has 30 indicators of effective sheltered instruction that are organized under 2 main areas: lesson planning and coaching and inquiry sessions. SI has eight major components: lesson preparation, interaction, building background, practice/application, comprehensible input, lesson delivery, strategies, and review/assessment.

Philosophy: The rationale for Sheltered Instruction is: 1. To dispel myths about English Language Learners, 2. To raise teacher and student expectations, 3. To increase academic achievement in the content areas, and 4. To accelerate second language acquisition to ensure adequate yearly progress (AYP).

TEXTEAMS

Origination: The Textteams started at Texas Educational Agency (TEA) in the 80's. The Textteam Math Institute was developed in the mid 90's by the Dana Center under the Texas Statewide Systemic Initiative as a state-level mathematics program and funded by the Eisenhower Discretionary Funds.

Implementation: Textteams is a comprehensive system of professional development based on the mathematics and science Texas Essential Knowledge and Skills (TEKS). Professional Development is provided through a trained network of leaders who then provide training to teachers from that area on a more local level that is customized to meet the needs of a district or school.

Philosophy: The Institute is developed around the following philosophy and beliefs: • Teachers at all levels benefit from extending their own mathematical and scientific knowledge and understanding to include new content and new ways of conceptualizing the content they already possess. • Professional development experiences, much like the school mathematics and science curriculum itself, should focus on a few activities in great depth. • Professional development experiences must provide opportunities for teachers to connect and apply what they have learned to their day-to-day teaching.

References

- Fisher, J., Warshauer, M., McCabe, T., Warshauer, H., Johnson, C. (2005). *A Summary of Professional Development Models Used in the State of Texas*. Texas State University-San Marcos.
- Morgan, D.L. (1988). *Focus groups as qualitative research*. London: Sage.
- The TSUS MELL Project Web Site <http://www.tsusmell.org/pages/1/index.htm>