






Using Action Research
&
Assessments of Teacher Knowledge
To Foster Effective Math Instruction

PREPARING FOR SUCCESS IN ALGEBRA
LAUSD – District 6
In partnership with UCSD, SDSU, UCI, and SDMP

Slide 1

Presenters

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For Your Reference 

- Copies of the slides for this presentation are posted on our website: www.camsp.net.
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Two Potential Contributors to the Success of Our Project

- Action Research Projects
- Tests of Teacher Knowledge

Collaborative Action Research

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Tests of Teacher Knowledge

Math & Language

Test of Math Knowledge

- An assessment that is used to test the mathematics knowledge of teachers.
- Developed by Deborah Lowenberg Ball, Dean of School of Education, the University of Michigan

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Who took the test?


Table 1: Number and Percent of Teacher Participants in Preparing for Success in Algebra, by Grade Level, 2009-2010

Grade	Number	Percent
5th	65	61%
5th/6th	2	2%
6th	23	22%
6th-8th	2	2%
7th	4	4%
7th/8th	6	6%
8th	4	4%
TOTAL	106	100%

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When did we give participants the test?

- We gave the Test of Knowledge of Mathematics to participants at the beginning and end of year 1 of the project.
- We plan to give the Test of Knowledge of Mathematics at the end of years 2 and 3 of the project.



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How did we use the results in PD?


- We adjusted PD instruction based on identified participant needs and the necessity of further deepening of participants' content knowledge and effective practices for mathematics instruction.
- We found that our teachers needed to know more about specific areas of mathematics, for example, ratios and proportions and we focused our attention on building their knowledge of those areas.

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What were the results?

- The level of math knowledge increased after teachers participated in the program.
- The average gain score on the test was 5.06 with a standard deviation of 3.72.



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What were the results?

- Table 2: Test of Knowledge of Mathematics***

	Pre-Test	Post-Test
Mean	13.73	18.70
SD	5.61	4.44
SEM	0.67	0.53
N	71	71

$p < .0001$ ($t = 10.5588$, $df = 70$, standard error of difference = 0.47)

*The mean of the Pre Test Group minus the Post Test Group equals -4.97; there is a 95% confidence interval of this difference: From -5.91 to -4.03.

Did the scores correlate with student scores on the CST Mathematics?

- There is a weak positive correlation of gains in teacher knowledge to students' performance on the CST-Mathematics ($r = .14$).


Table 3: Number and percent of Preparing for Success in Algebra teachers whose students increased or decreased levels on the CST – Mathematics (e.g., moving from Advanced to Proficient or Proficient to Basic)*

	Increase	Decrease
Grade 5	14/46 (30%)	33/46 (70%)
Grade 6	6/14 (43%)	8/14 (57%)
Grades 7/8	12/14 (86%)	2/14 (14%)
Total	32/74 (43%)	43/74 (58%)



Test of Language Knowledge

- This test assesses teachers' knowledge of the Language of Mathematics and their ability to teach it to language learners.
- The test takes about one hour.
- The results of the test allow us to tailor PD to the specific instructional needs of participants.



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Who developed this test?

Project evaluator: Robin Scarcella
 Our CaMSP Leadership Team:


- Sudha Venkatesan
- Gretchen Laue
- Dolly Casco
- John Elwin
- Rafaela Santa Cruz
- Marisol Muniz

With the support of:
 LAUSD coaches and experts: Stephanie Flaxbeard, Kathy Stevens
 SDMP team of math experts: Esmeralda Orozco, Sandra Casares, and Ivette Sanchez-Gutierrez

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What is included in the test blueprint?

- The Language of Mathematics
- Effective instructional techniques
- Language assessment/differentiation by levels of English proficiency



Blueprint available on website

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What is a typical item?

The following items pertain to Ms. Cortinez and the language or word problems.

Mr. Cortines asks his students to solve the following word problem:
Ms. Jamieson, the vice president of sales, took a client out to lunch. If the lunch was \$44 and she gave a 20% tip, how much money did she spend on lunch?

A. \$8.80
 B. \$35.20
 C. \$52.80
 D. \$53.80

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Which of the language features listed in the table below will make the word problem difficult for Ms. Cortinez' intermediate-level English learners to solve?

1. the proper noun, Ms. Jamieson
 A. Yes
 B. No
 C. I'm not sure

2. the prepositional phrase *of sales*
 A. Yes
 B. No
 C. I'm not sure

3. the conditional clause that begins with the word *if* - *If the lunch was...*
 A. Yes
 B. No
 C. I'm not sure

4. the word *lunch*
 A. Yes
 B. No
 C. I'm not sure

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Who did we give the test to in our CaMSP project?

- LAUSD District 6 teachers that participated in the Preparing for Success in Algebra Program; Seventy-eight teachers completed both the pre-test (given July 2009 at the beginning of Year 1 of the project) and an equated post-test (given in June 2010 at the end of Year 1 of the project).

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Why did we use the test with the teachers in our project?

- To assess the correlation between the teachers' prior mathematics language knowledge and the improvement after their participation in the Preparing for Success in Algebra Program.

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What were the results?

- Teachers' scores on this test significantly improved from the beginning of the first year of the project to the end of the first year of the project ($p < .0001$, $t = 14.0785$, $df = 77$).



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What were the results?

Table 4: Test of Knowledge of Language*

	Pre-Test	Post-Test
Mean	34.72	44.41
SD	3.86	5.82
SEM	0.44	0.66
N	78	78

$p < .0001$ ($t = 14.0785$, $df = 77$, standard error of difference = 0.688)
 *The mean of the Pre Test Group minus the Post Test Group Two equals -9.69; there is a 95% confidence interval of this difference: From -11.06 to -8.32.



What were the results?

- The teachers who completed the test given at the beginning of the first year of the project had a mean of **34.72** and a standard deviation of 3.9.
- In contrast, these same teachers had a mean of **44.41** and a standard deviation of 5.82 at the end of the first year of our Preparing for Success in Algebra teacher professional development institutes, follow-up sessions and activities.

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Did the scores correlate with student scores on the CST Mathematics?

- In the first year of the study, we examined whether English learners who were taught by teachers with high scores on the Language Knowledge Test performed better on the CST in Mathematics than English learners who were taught by teachers with poor scores on the Language Knowledge Test. There was a positive correlation.

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Student Language Assessment

- We are also in the process of developing a direct assessment of student knowledge of the Language of Mathematics



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What is action research?

- A process in which participants examine their own educational practices systematically and carefully, using the techniques of research. ~Watts, 1985, p. 118

The purpose of the action research projects is bridging research and practice.

[Videos >> Marta Atilano](#)

Steps for organizing and implementing the action research projects with LAUSD Local District 6 teachers

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The Model: www.camsp.net

Preparing for Success in Algebra

California Mathematics and Science Partnership • Los Angeles Unified School District, Local District 6

Welcome | About Us | News and Updates | Community | Resources | Makeup | Research and Results | Action Research | Videos

This page will be used to track action research projects

Resources

- Collaborative Action Research for Professional Learning Communities by Richard Sagor
- What We Know About Mathematics Teaching and Learning by MCREL

Year 2 Action Research Planning

- **NOTE:** Group numbers have changed from last year. Please reference this list to see your group number:
- October 23 Updates: Group 8 (Work Plan) - Group 9 (Brainstorming, Work Plan) - Group 19 (Work Plan)
- Brainstorming -A-1-2-3-4 (Thunder Cats)-5-6-7-8-9-10-11-12 (Transformers)-13 (Bryson)-14-15-16-17-18-19-20-21-
- Work Plan -A-1-2-3-4 (Thunder Cats)-5-6-7-8-9-10-11-12 (Transformers)-13 (Bryson)-14-15-16-17-18-19-20-21-


Action Research Planning from Follow Up #2

Play Slideshow

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Process and Accountability



Action Research - Rubric for Final Report

Criteria for Evaluation	3 (exceeds)	2 (meets)
1. Introduction: Project title, grade	All four areas are addressed.	Three areas are

Action Research Brainstorming - Year 2

Group # _____

Description	Brainstorming	Comments
1. Team Members		

Video of action research

Action Research



Collaborative Action Research

Elvira Vargas,
Laura Quintanar,
and Cora Prado

This action research project, a collaboration between Elvira Vargas, Laura Quintanar, and Cora Prado, focused on ratios and proportions.

[Click here to download the report as a Word document.](#)

1. Identification of Problem area: Ratios and Proportions

The CST is composed of 39 % of questions related to number sense (28 out of a total of 72 questions). Ratios and proportions are part of this category, as students are required to use multiple math skills to solve problems. [Click to see the relevant standards:](#)

2. Collection of Data:

A. The teachers in grade 6 were able to use the LAUSD Quarter Assessment Data in order to identify the problem. The data was


generated by classroom and was divided to five scoring categories: Advanced 85-100%, Proficient 66-84%, Basic 48-65%





An Example of an Action Research Project:
<http://www.camsp.net/html/community.html>

Action Research



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1. Identification of Problem area: Ratios and Proportions

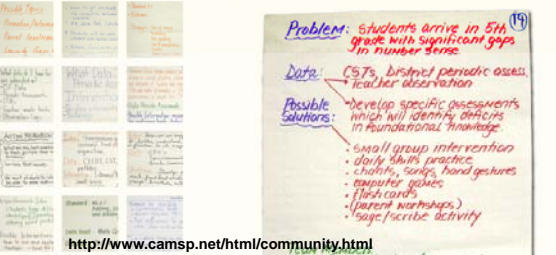
The CST is composed of 39 % of questions related to number sense (28 out of a total of 72 questions). Ratios and proportions are part of this category, as students are required to use multiple math skills to solve problems. Click to see the relevant standards:

2. Collection of Data:

A. The teachers in grade 6 were able to use the LAUSD Quarter Assessment Data in order to identify the problem. The data was reviewed by classroom and was divided in four section categories: Advanced 66-100%, Proficient 66-94%, Basic 48-65%.

Another Example of a Project

Action Research Planning from Follow Up #2



<http://www.camsp.net/html/community.html>

Evidence for the Effectiveness of the Action Research Projects

- Results of students taught by Preparing for Success Teachers, provided by teacher participants
- Overall success of project, evaluated by positive increases in CST-Mathematics scores (difficult to tell where success is coming from, but action research projects characterize our CaMSP Project).

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Conclusion

- We will continue to investigate the impact that action research and tests of teacher knowledge have on student achievement.
- We hope our findings will lead to greater use of both action research and teacher knowledge tests in professional development, with emphasis on both content and language skills.

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