

Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching



Program Summary TEA Final Report

2009 – 2010 Grant

For additional information regarding the Texas Regional Collaboratives, please contact Kamil A. Jbeily, Executive Director, at kjbeily@mail.utexas.edu and/or Carol Fletcher, Assistant Director, at carol.fletcher@mail.utexas.edu.

For online resources, please view the TRC website at www.theTRC.org

Table of Contents

TEXAS REGIONAL COLLABORATIVES FOR EXCELLENCE IN SCIENCE AND MATHEMATICS TEACHING (TRC)	3
MISSION	3
PROGRAM DESCRIPTION	3
TRC NETWORK	4
SCIENCE REGIONAL COLLABORATIVES	5
MATHEMATICS REGIONAL COLLABORATIVES	6
TEACHERS AND STUDENTS SERVED	10
FIGURE 2. DISTRICT PARTICIPATION IN THE TRC	10
TRC PDA EVALUATION RESULTS	ERROR! BOOKMARK NOT DEFINED.
TEACHER IMPACT	18
TEACHER CONTENT KNOWLEDGE	29
STUDENT IMPACT	ERROR! BOOKMARK NOT DEFINED.
MID-CAREER TEACHER RECRUITMENT 2009-2010	33
CHALLENGES AND SUCCESSES	34
CONCLUSION	35



Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching

Program Summary/TEA Final Report

2009-10 Grant

Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching (TRC)

The TRC is an award-winning statewide network of sixty P-16 partnerships that provide sustained and high intensity professional development to P-12 teachers of science and mathematics across the state. This infrastructure of over 48 institutions of higher education collaborating with the Texas Education Agency, education service centers, school districts, and business partners, has a 17-year track record of designing and implementing exemplary professional development using research-based instructional models, materials, and best practices.

Mission

To provide Texas science and mathematics teachers with support systems of scientifically researched, sustained, and high intensity professional development and mentoring to assist them in the implementation of the Texas Essential Knowledge and Skills (TEKS). Our programs equip teachers with the knowledge and skills to engage students in meaningful science and mathematics learning experiences. Activities are designed to improve students' scientific, mathematical and technological literacy, and inspire them to pursue science and engineering related careers.

Program Description

The TRC has three basic components of professional development. First, **Instructional Team Members**, or **ITMs**, from each Regional Collaborative are assembled to provide training to classroom teachers. Instructional Teams ideally consist of professors of Mathematics, Mathematics Education, Mathematics Specialists, Science, Science Education, Science Specialists and Master Teachers in each region. **Professional Development Academies (PDAs)** are provided by the TRC to ITMs from across the state to focus instruction on the priorities set by the Texas Regional Collaboratives and the Texas Education Agency and to improve the quality and effectiveness of professional development provided to teachers. PDAs enhance the knowledge and skills necessary to develop, sustain, and facilitate high quality Professional Development Programs in each region.

Second, each Regional Collaborative develops a **Professional Development Program (PDP)** that addresses both the TRC and TEA priorities for the year and the unique needs of teachers in their region. The PDP is provided to a network of **Science Teacher Mentors (STMs)** or **Mathematics Teacher Mentors (MTMs)** from multiple districts in each region. A minimum of 25 STMs and MTMs from each Regional Collaborative is required, but several Collaboratives serve more than double that

number. The PDP consists of training to improve teacher science content knowledge, instructional skills, classroom practice, and leadership capacity. In 2008-09, STMs received an average of 107 contact hours of professional development in these areas. The Mathematics Collaboratives have been tasked with building a sustained network in their first 3 years. In 2007-2008 they averaged 75 hours of professional development contact hours. Through their participation in the TRC, STMs and MTMs also receive the instructional materials necessary to implement the hands-on inquiry based lessons that they have been trained on in their classrooms.

Through experiences with the Regional Collaboratives, STMs and MTMs become true leaders in science and mathematics education in their schools and districts. To maximize the investment made in these individuals, STMs are required to mentor additional teachers, termed **Cadre Members (CMs)**, throughout the year, and serve as resources for improving student experiences in science both regionally and statewide. In 2009-10 MTMs were required to do the same for the first time. Using this multiplier effect, the TRC is able to scale up the number of teachers served across the state at a relatively low cost. Some mentoring occurs informally through the sharing of ideas and expertise on a campus level, team teaching, and coaching. In addition, many STMs provide formal training and outreach through workshops on science topics such as chemistry and physics, 5E lesson planning and implementation, aligning instruction and assessment to the TEKS and TAKS, and other more specific locally based training. This mentoring model gives STMs an opportunity to grow professionally as leaders while remaining classroom teachers. Such professional growth is not often encouraged within the confines of the traditional limitations of school culture.

This makes participation in the TRC especially valuable to experienced teachers who wish to improve their knowledge, skills, and leadership without leaving the classroom. Cadre Members receive an average of 12 documented hours of mentoring, training, and support. Many individual teachers that participated as CMs during the 2007-08 project year chose to increase their level of commitment and become STMs for the 2009-10 program. Each of these components contributes to the overall goal of improving the quality and rigor of classroom science and mathematics instruction for P-12 students.

TRC Network

During the 2009-10 grant period, the TRC issued subawards to support **36 Regional Science Collaboratives and 24 Regional Mathematics Collaboratives** across the state. Each Regional Collaborative consisted of a partnership among numerous organizations and stakeholders with a vested interest in quality science/mathematics instruction including institutes of higher education, school districts, charter schools, private schools, education service centers (ESCs), and business and industry. Science and Mathematics Regional Collaborative grantees are listed in the next section by fiscal agent.

Science Regional Collaboratives

Each year, the TRC offers Professional Development Academies (PDAs) in science content areas and grade levels consistent with state priorities and student achievement data. For the grant year 2009-2010, each Science Regional Collaborative provided professional development in Earth Science for Grades K-8, Chemistry, and/or Physics. Chemistry and Physics training focused primarily on grades 6 -12.

Science Regional Collaboratives

1. Region 1 Science Collaborative / Edinburg
2. UT-Brownsville Regional Science Collaborative / Brownsville
3. UT-Pan American Regional Science Collaborative / Edinburg
4. TAMU Regional Science Collaborative / Laredo
5. TAMU-Corpus Christi / ESC 2 Regional Science Collaborative / Corpus Christi
6. Region 3 Science Collaborative / Victoria
7. Region 4 Science Collaborative / Houston
8. Lake Houston Regional Science Collaborative / Humble
9. Rice University Regional Science Collaborative / Houston
10. UH-Clear Lake / EIH Regional Science Collaborative / Houston
11. Aldine ISD Regional Science Collaborative / Houston
12. Galveston County Regional Science Collaborative / Galveston
13. Region 5 Science Collaborative / Beaumont
14. TAMU-College Station Regional Science Collaborative / College Station
15. Region 7 Science Collaborative / Kilgore
16. Region 8 Science Collaborative / Mount Pleasant
17. TAMU-Texarkana Regional Science Collaborative / Texarkana
18. Region 9 Science Collaborative / Wichita Falls
19. Region 10 Science Collaborative / Richardson
20. UT-Dallas Regional Science Collaborative / Dallas
21. Region 11 Science Collaborative / Fort Worth
22. University of North Texas Regional Science Collaborative / Denton
23. North Central Texas College Regional Science Collaborative / Gainesville
24. Region 12 Science Collaborative / Waco
25. Region 13 Science Collaborative / Austin
26. Capital City Regional Science Collaborative / Austin
27. ACC Regional Science Collaborative / Austin
28. Region 14 Science Collaborative / Abilene
29. Region 15 Science Collaborative / San Angelo
30. Region 16 Science Collaborative / Amarillo
31. Region 17 Science Collaborative / Lubbock
32. Region 18 Science Collaborative / Midland
33. Region 19 Science Collaborative / El Paso
34. Region 20 Science Collaborative / San Antonio
35. OLLU Regional Science Collaborative / San Antonio
36. UT-Tyler Regional Science Collaborative / Tyler

Mathematics Regional Collaboratives

In July 2006, the TRC launched a new initiative funded by the Texas Education Agency (TEA) to provide high quality professional development for Texas mathematics teachers. After a competitive process, grants were awarded to 20 partnerships across the state. For the grant year 2008-09, 24 Mathematics Regional Collaboratives continued to provide professional development utilizing the mathematics modules developed by TEA in collaboration with universities across the state. During this grant period, we instituted a requirement for all awardees to host, at minimum, a week-long summer session for Mathematics Teacher Mentors. This Professional Development structure of extended time in professional development plus intensive follow-up has been supported in research on improving teacher practice. Additionally, all projects were provided opportunities to attend trainings on assessing teachers mathematics knowledge to support the federal requirements to demonstrate improvement in teachers' content knowledge.

Project Directors were also provided opportunities to attend Professional Development Academies on

- Fostering Algebraic Thinking (6-10),
- Geogebra,
- Children's Thinking in Measurement,
- High School Geometry,
- Assessing Young Children's Understanding of Fractions and Whole Numbers,
- Algebra II Concepts for High School,
- Learning to Lead Mathematics Professional Development and,
- M-STAR (Algebra Readiness for Middle School).

Professional Development Academies are designed so that Projects can deliver research-based professional development focused on mathematical content to the teachers in their programs. Many Collaboratives supported teachers' attendance to the 2009 Conference for Advancement in Mathematics Teaching (CAMT), as well.

Mathematics Regional Collaboratives

1. Region 1 Mathematics Collaborative / Edinburg
2. UT-Brownsville Regional Mathematics Collaborative / Brownsville
3. Region 2 Mathematics Collaborative / Corpus Christi
4. Region 3 Mathematics Collaborative / Victoria
5. Region 4 Mathematics Collaborative / Houston
6. Region 5 Mathematics Collaborative / Beaumont
7. Region 6 Mathematics Collaborative / Huntsville
8. Region 7 Mathematics Collaborative / Kilgore
9. UT-Tyler Regional Mathematics Collaborative / Tyler
10. Region 8 Mathematics Collaborative / Mount Pleasant
11. Region 9 Mathematics Collaborative / Wichita Falls
12. Region 10 Mathematics Collaborative / Richardson
13. Region 11 Mathematics Collaborative / Ft. Worth
14. NCTC Regional Mathematics Collaborative / Gainesville
15. Region 12 Mathematics Collaborative / Waco

16. Region 13 Mathematics Collaborative / Austin
17. Region 14 Mathematics Collaborative / Abilene
18. Region 15 Mathematics Collaborative / San Angelo
19. Region 16 Mathematics Collaborative / Amarillo
20. Region 17 Mathematics Collaborative / Lubbock
21. Region 18 Mathematics Collaborative / Midland
22. Region 19 Mathematics Collaborative / El Paso
23. Region 20 Mathematics Collaborative / San Antonio
24. OLLU Regional Mathematics Collaborative / San Antonio

During the 2009-10 grant period, **56** Institutions of Higher Education partnered with Regional Collaboratives across the state to provide high quality science and mathematics professional development. While many of these were fiscal agents as noted previously, still others partnered with ESCs to provide coursework and training to teachers.

- Abilene Christian University
- Amarillo College
- Angelo State University
- Austin Community College
- Baylor University
- Concordia University Texas
- Del Mar College
- Hardin-Simmons University
- Kansas University
- Lamar University
- Lee College
- Lone Star College - Kingwood
- Midland College
- Midwestern State University
- North Central Texas College
- Our Lady of the Lake University
- Rice University
- Sam Houston State University
- Stephen F. Austin State University
- Sul Ross State University
- Texarkana College
- Texas A&M University System
 - TAMU International
 - TAMU -Agricultural Research and Extension Center at Beaumont
 - TAMU - College Station
 - TAMU - Commerce
 - TAMU - Corpus Christi
 - TAMU - Galveston
 - TAMU - Texarkana
- Texas Christian University
- Texas Southern University
- Texas State University
- Texas Tech University
- Texas Tech University / T-STEM
- Texas Women’s University
- University of Houston
- University of Houston-Clear Lake
- UH-Clear Lake/Environmental Institute of Houston
- University of Northern Iowa
- University of Dallas
- University of North Texas
- The University of Texas System
 - University of Texas at Arlington
 - University of Texas at Austin
 - University of Texas at Austin, Bureau of Economic Geology
 - University of Texas at Austin, McDonald Observatory
 - University of Texas at Brownsville
 - University of Texas at Dallas
 - University of Texas at El Paso
 - University of Texas - Pan American
 - University of Texas – Permian Basin
 - University of Texas at Tyler
 - University of Texas Medical Branch
- University of the Incarnate Word
- Victoria College
- West Texas A&M University

Instructional Team Members for the Collaboratives from these colleges and universities provided training to P-12 teachers and served as content experts. In addition to faculty members in higher education, other ITMs included informal science providers such as museum staff members, education service center science and mathematics specialists, and K-12 science and mathematics administrators. The greatest number of ITMs were Instructional Specialists (37%) followed by master teachers (20%) and science professors (14%). Math professors composed 6% of the ITMs. Education professors, typically from a college of education, comprised 7% of ITMs with the rest distributed among K-12/IHE administrators, informal science educators, and professors of engineering, Figure 1.

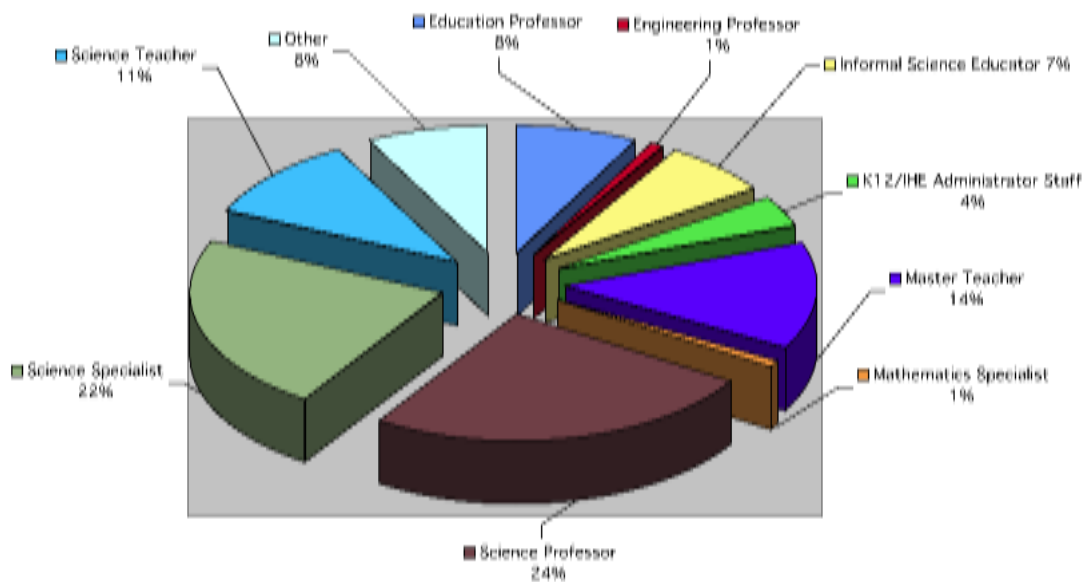


Figure 1: Distribution of ITMs 2009-2010

Teachers and Students Served

In addition to these higher education and ESC partners, teachers from **746 school districts and charter schools** and **2,371 campuses** participated in the Texas Regional Collaboratives science program. The Mathematics Regional Collaboratives served teachers in **778 districts and charter schools** representing **2,244 campuses**. The orange area in Figure 2. below represents district participation in the TRC.

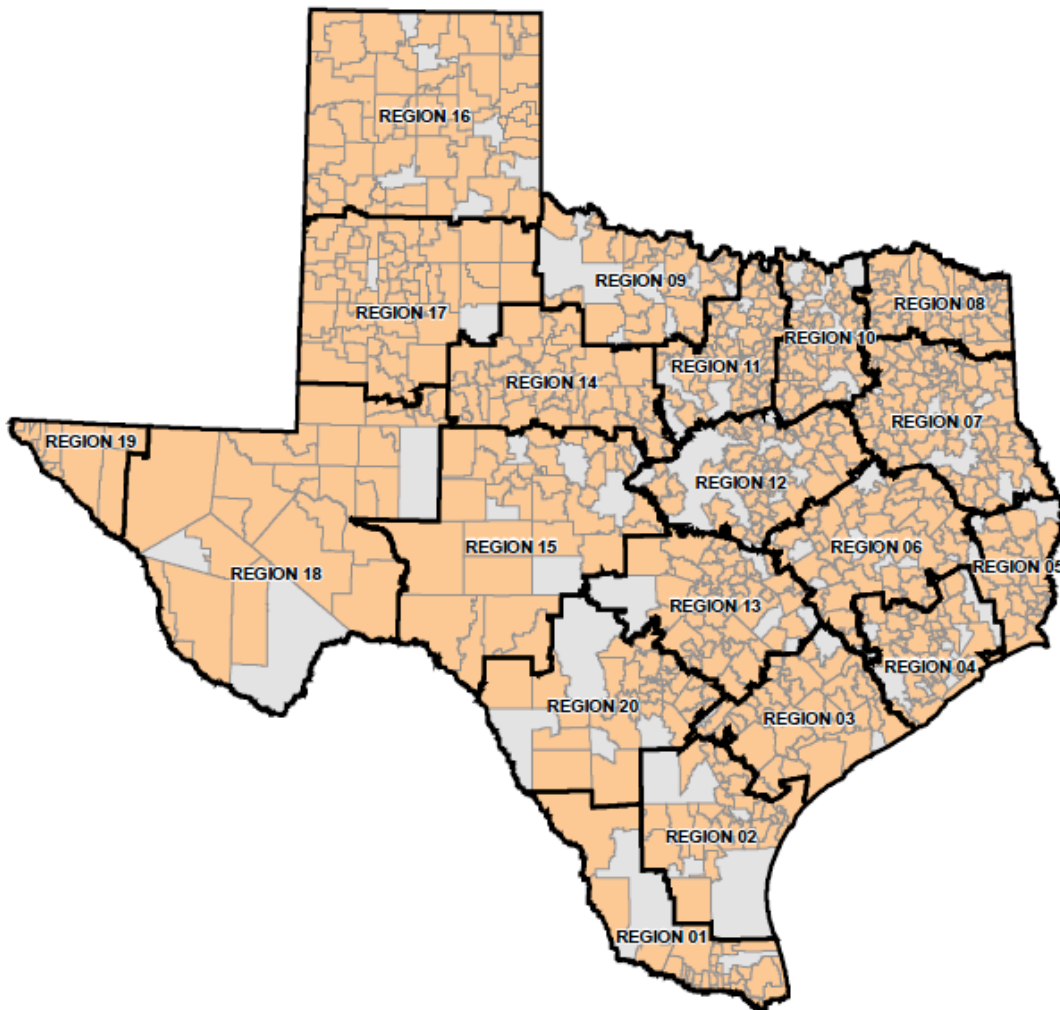


Figure 2. District Participation in the TRC

During the 2009-10 project year, a total of **8,614 science educators and 6,884 mathematics educators** were served by the Texas Regional Collaboratives. The total number of **Science Teacher Mentors (STMs)** served in 2009-10 was **1,471**. Each STM received an average of 107 contact hours of professional development. The total number of **Cadre Members (CMs)** served was **7,143** with each CM receiving an average of 16 contact hours. The total number of **Mathematics Teacher Mentors** served in 2009-10 was **921**. The total number of **Cadre Members (CMs)** served was **5,963** with each CM receiving an average of 16 contact hours.

The **total number of contact hours** provided by the TRC was **366,745** (Science **212,972** and Math **153,773**). This included college credit hours that many teachers earned through taking coursework at the Institutions of Higher Education listed previously. Such college courses primarily focus on improving teachers' science content knowledge and are taught by science and science education professors from across the state. Many teachers are able to use their involvement in the TRC to earn a master's degree from institutions that work in close collaboration with the Regional Collaboratives such as Texas Tech, UT-Brownsville, UT-Pan American, Texas A&M-Textarkana, and Our Lady of the Lake University.

Based on an average student/teacher ratio of 64 students per TRC science teacher, approximately **451,206 students** have been impacted by TRC professional development in science. Mathematics teachers averaged 59 students per teacher for a total impact of **347,072 students**.

A breakdown of teacher demographics is described in Tables 1-7 while school and student demographics are described in Tables 8-11.

Table 1. Teacher Gender

	Science		Math	
	Number	Percent	Number	Percent
Male	1,400	16%	968	14%
Female	7,214	84%	5916	86%

Table 2. Teacher Ethnicity

	Science		Math	
	Number	Percent	Number	Percent
African American	585	7%	410	6%
Asian American	153	2%	68	1%
Caucasian	5,554	64%	4,838	70%
Hispanic	1,959	23%	1,280	19%
Native American	32	<1%	27	<1%
Other	70	1%	46	1%

Figure 3. TRC Science Teacher Ethnicity

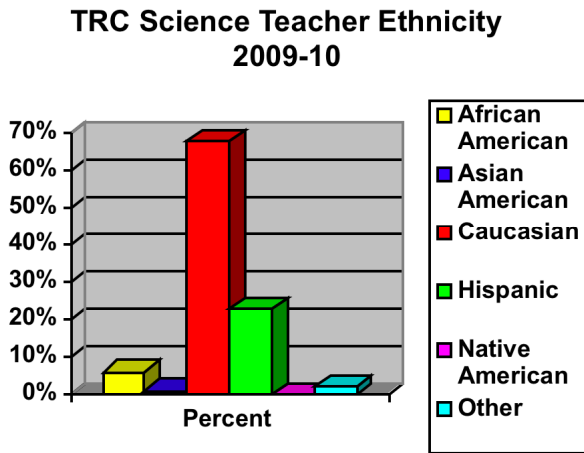


Figure 4. TRC Math Teacher Ethnicity

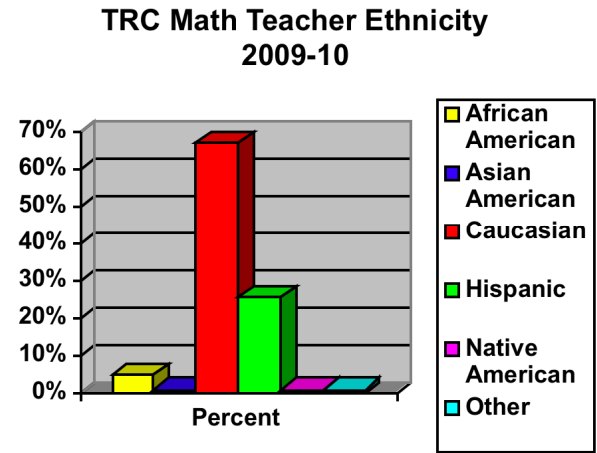


Figure 6. TRC Science Teacher Level

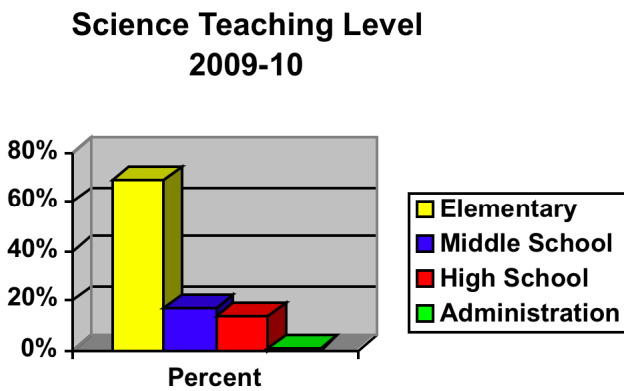


Figure 7. TRC Math Teacher Level

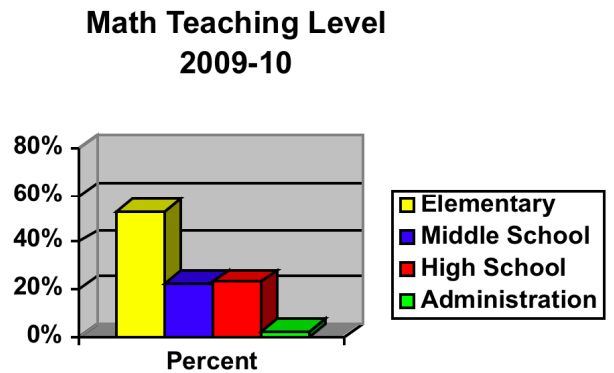


Table 3. Teaching Level, Job Title, and Average Years of Experience

	Science		Math	
	Number	Percent	Number	Percent
Elementary	3,646	42%	2,463	36%
Middle School	1,103	13%	851	12%
High School	1,107	13%	1,119	16%
Classroom Teacher	6,821	79%	6,417	89%
Specialist/Facilitator	265	3%	207	3%
Education Student	335	4%	139	2%
Paraprofessional	83	1%	69	1%
Informal Education	31	<1%	1	<1%
Non-Teaching Science Coach	54	<1%	1	<1%
Non-Teaching Math Coach	1	<1%	49	1%
ESC	2	<1%	2	<1%
Consultant	6	<1%	2	<1%
Administrator	78	1%	171	2%
Other	174	2%	171	2%
Average Years Of Experience	11		12	

Table 4. Highly Qualified

	Science		Math	
	Number	Percent	Number	Percent
Yes	5,149	60%	4,602	67%
No	218	3%	161	2%
Not Sure	1,538	18%	1,092	16%

Table 5. Grades Currently Taught

Science						
	Number	Percent		Number	Percent	
<i>PreK</i>	133	2%		<i>6th</i>	681	8%
<i>K</i>	411	5%		<i>7th</i>	687	8%
<i>1st</i>	532	6%		<i>8th</i>	748	9%
<i>2nd</i>	639	7%		<i>9th</i>	752	9%
<i>3rd</i>	728	9%		<i>10th</i>	975	11%
<i>4th</i>	825	10%		<i>11th</i>	992	12%
<i>5th</i>	1,153	13%		<i>12th</i>	826	10%

Math						
	Number	Percent		Number	Percent	
<i>PreK</i>	163	2%		<i>6th</i>	1,017	15%
<i>K</i>	637	9%		<i>7th</i>	885	13%
<i>1st</i>	776	11%		<i>8th</i>	925	13%
<i>2nd</i>	967	14%		<i>9th</i>	1,272	18%
<i>3rd</i>	1,101	16%		<i>10th</i>	1,558	23%
<i>4th</i>	1,102	16%		<i>11th</i>	1,537	22%
<i>5th</i>	1,429	21%		<i>12th</i>	1,283	19%

Table 6. Subject Currently Taught

Science		
	Number	Percent
Elementary Science	3,355	39%
Middle School Science	1,384	16%
IPC	332	4%
Biology	498	6%
Chemistry	486	6%
Physics	325	4%
AP/IB Science	148	2%
Other Science	392	5%
Note: Some teachers instruct multiple subjects; therefore, % will not add to 100%.		

Table 7. Subject Currently Taught

Math		
	Number	Percent
Elementary Math	3,990	58%
Middle School Math	1,108	16%
AP/IB Math	55	1%
Algebra 1	587	9%
Algebra 2	425	6%
Geometry	516	7%
Calculus	126	2%
Math Models	272	4%
Other Math	448	7%
Note: Some teachers instruct multiple subjects; therefore, % will not add to 100%.		

Table 8. Campus Type

	Science		Math	
	Number	Percent	Number	Percent
Public	2,037	99%	1811	97%
Charter	26	1%	51	3%

Table 9. Poverty Level

	Science		Math	
	Number of schools	%	Number of schools	%
Low (<35%)	104	4%	47	4%
Medium (35%-50%)	402	14%	222	17%
High (51%-75%)	1146	40%	608	46%
Extremely High (>75%)	1204	42%	442	34%

Figure 8. TRC Science Free Lunch

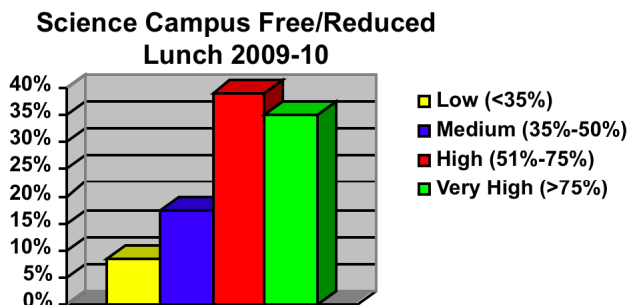


Figure 9. TRC Math Free Lunch

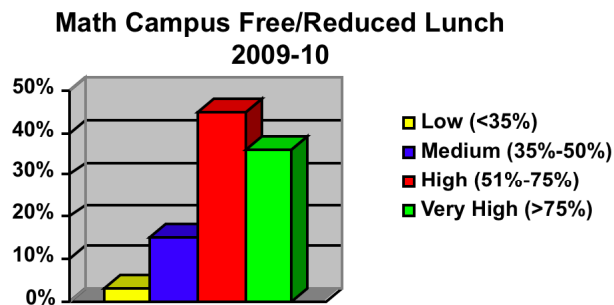


Table 10. Title I Status

	Science		Math	
	Number	Percent	Number	Percent
YES	1,428	69%	1,319	71%
NO	635	31%	543	29%

Table 11. Student Ethnicity

	Science		Math	
	Number	Percent	Number	Percent
African American	32,842	12%	28,689	12%
Asian American	5,550	2%	2,686	2%
Caucasian	97,631	37%	83,393	40%
Hispanic	122,894	47%	89,305	46%
Native American	717	0.2%	809	0.3%
Other	3331	1%	1,328	1%

Figure 10. TRC Science Student Ethnicity

Science Student Ethnicity 2009-10

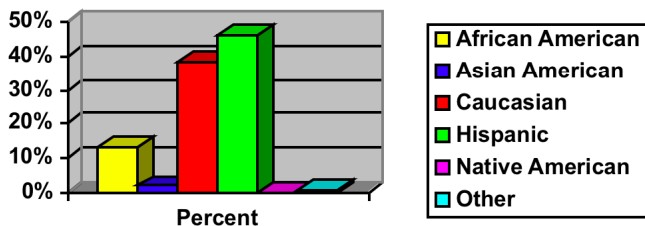
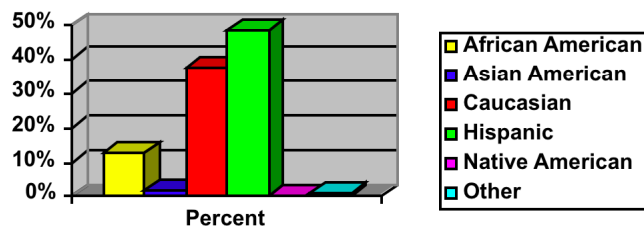


Figure 11. TRC Math Student Ethnicity

Math Student Ethnicity 2009-10



The TRC delivered Science and Math Professional Development Academies (PDAs) to ITMs from across the state in 2009-10 as described in Tables below. In summary, the TRC provided 654 hours of professional development to 377 participants.

Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching PDA Schedule for May 1, 2009-August 31, 2010					
Science	Mathematics	Title	Date	Hours	Attendees
	X	Assessing Children's Algebraic Thinking: K-2	5/4/09-5/5/09	12	18
	X	Assessing Children's Thinking about Fractions:3-5	5/7/09-5/8/09	18	12
X		Elementary Engineering	5/12/09-5/13/09	27	12
	X	Instrument Dissemination Workshop: Learning Mathematics for Teaching Project	5/18/09	43	6
	X	Learning to Lead Mathematics Professional Development	5/26/09-5/29/09	43	18
X		Next Generation GLOBE	6/8/09-6/10/09	20	18
X		TXESS Revolution Summer Institute	6/14/09-6/20/09	21	35
X		Physics PDA- Electricity	7/6/09-7/10/09	37	30
	X	Jazz Up Math With Journals	9/1/09	49	6
X	X	Early Childhood Math/Science PDA	9/17/09-9/19/09	56	18
X		Elementary Chemistry	11/12/09-11/13/09	47	12
X		TXESS Revolution PDA #5	11/12/09-11/14/09	27	24
	X	Fostering Geometric Thinking: 5-10	12/7/09-12/10/09		
X		SECO (State Energy Conservation Office) PDA	12/14/09-12/16/09	37	18
	X	Developing Mathematical Ideas Part 1	1/11/10-1/15/10	21	30
	X	Algebraic and Geometric Modeling Revisited (HS)	1/27/10-1/30/10	16	24
X		HEADS UP: Middle and High School Life Science	2/3/10-2/5/10	21	18
X		Making Science Accessible for English Learners	3/1/10-3/2/10	33	12
X		Imagine Mars: Using Creative Thinking Skills to Promote STEM Learning	4/12/10-4/13/10	28	12

	X	ESTAR: Elementary School Students in Texas: Algebra Ready	4/28/10-4/30/10	38	18
	X	Developing Mathematical Ideas Part 2	5/17/10-5/21/10		
	X	MSTAR: A Geometric Approach to Algebra Readiness	5/25/10-5/27/10	36	18
X		Games in Science Education: Addressing Science and Technology Standards Through On-Line Games	7/12/10-7/13/10		
X		UT Summer Science Institute-Energy and Motion	7/1/10-7/16/10		
X		UT Summer Science Institute-Energy and Matter in Biological Systems	7/19/10-7/23/10		
	X	ESTAR: Elementary School Students in Texas: Algebra Ready	7/19/10-7/21/10		
	X	ESTAR: Elementary School Students in Texas: Algebra Ready <i>Administrator Day</i>	7/22/10		
	X	MSTAR: Geometric Approach to Algebra Readiness (Repeat)	7/2/10-7/22/10	24	18

TRC Science Professional Development January-August, 2009 Successes and Challenges

Professional development academies (PDA) that were offered to all the regional science and math collaboratives of the Texas Regional Collaboratives (TRC) during the 2009-2010 school year encountered both successes and challenges that will be addressed in this report. By evaluating the positive as well as negative aspects of PDAs, the feedback can help in refining PDAs to better serve the teachers who participate in them. The majority of the science and math collaboratives stated that the main successes of PDAs led to four major improvements in teacher learning and development: (1) teachers were successful because they worked in groups to learn the new teacher materials and procedures that would be implemented in their classrooms, (2) teachers implemented learned science and math activities in classrooms and stated that they were being successful with their students, (3) teachers demonstrated an increase in overall positive attitude toward science and math content with which they were not comfortable initially, and (4) teachers showed an increase in knowledge and implementation of technology.

These successes were documented through surveys from participating teachers that highlighted the positive aspects of the PDAs that were offered. Attendance and

participation at the PDAs were high as a result and the resources given to the teachers at the sessions were used effectively in the classroom. Moreover, participating teachers had requested that more workshops and training sessions be scheduled which will lead to further opportunities to increase their knowledge base, teaching strategies, and instructional resources not only for their own classrooms but also to train their colleagues. This effect, in turn, has positively impacted the school districts the teachers work in since the resources and training provided by the TRC has supplemented the district's own standard curriculum and professional development opportunities. As one regional science collaborative states: "This collaboration has fostered a spirit of collegiality and cooperation between the school districts, the local partners and the university (and that) these linkages strengthen community ties and build local capacity so that teacher knowledge and skills can be improved, thus increasing student achievement levels."

Challenges, on the other hand, that the regional collaboratives encountered during the workshop and training sessions were relegated to logistics. For example, the scheduling of PDAs to meet the needs of both school districts and teachers were the most cited challenge by the collaboratives. Limited participation of some local school districts hampered some teachers to find the time, as well as substitutes, from attending workshops. Principals were sometimes unwilling to allow the teachers from their classroom duties thereby hampering attendance for some collaboratives. Some regional collaboratives reported not being able to qualified individuals to attend the workshops that were offered. In these instances, the teachers were not able to effectively translate and teach the materials to colleagues back at their home schools.

Although the majority of challenges stated by the participating collaboratives were related to logistical concerns in terms of scheduling and finding the right teacher to attend the PDAs, one major challenge reported dealt with the general content of the workshops that were offered. In the words of one project director, the "PDAs offered have very good science ideas but they all lack some important components that would help them become effective tools for each collaborative to gauge the growth of students' and teachers' in the serving districts." Furthermore, the following four areas highlight the general concerns that the collaboratives had in terms of what the individual PDAs were lacking: (1) Analyzing student work or campus' scores to identify particular weaknesses, (2) selecting from the limited number of skills or topics as priorities for improvement, (3) identifying the instructional resources needed and the appropriate models that will help the needs of the instructional priorities, and (4) having a monitoring tool available with each PDA to help assess the improvement of teacher and students that are exposed to the implementation of the specific professional developments.

Teacher Impact

The TRC program evaluation focuses on 3 major components:

- Impact on teacher practice and instructional skills
- Impact on teacher content knowledge
- Impact on student achievement

TRC educators were asked in the 16th Annual Meeting evaluation, “**How has the TRC made a difference for you as a professional educator?**” Statements from the teachers follow.

- I recently became a Milken Family Foundation Educator and was surprised with a \$25,000 monetary award. Many of the strategies used in my daily classroom lessons are aligned with the outdoor teaching techniques that are also shared through the TRC sessions that I have attended in the past. TRC instilled the confidence in science.
- TRC has opened up doors for me that I never imagined. I was Teacher of the Year at my campus and Outstanding Teacher of the Gifted for Region 20. I was also awarded the Mayoral/County Judge Outstanding Science Teaching award for San Antonio. If I was not able to attend the quality workshops that TRC provides to my district free of charge, I wouldn't be half the teacher I am today. I can't thank you enough for the opportunity to be part of TRC. It has made ALL the difference in my effectiveness as a teacher.
- Providing me with the most current mathematical information and helping me to mentor my MTMs as well as the collaboration with the other PDs of the other collaboratives.
- The community feeling of having others to go to with questions and share is wonderful. This was the first time in my 20 plus years of teaching, I felt I was treated as a professional.
- I think it has strengthened our region in math and strengthened me personally since I was able to collaborate with other specialists and teachers on a continuous basis all year long!
- The TRC provides me with a network of like-minded educators with which I can collaborate to improve my instructional practice. Having such a passionate group of people all working towards a common goal of improving STEM education is truly inspiring.
- Provided greater insights into K-12 science and math teaching and learning.
- Provides updated information from TEA, provides outstanding professional development, provides valuable network throughout the state.
- The TRC has made me a much more competent teacher and has also allowed me to make contacts all over the state to help me grow professionally.
- It has given me new direction in my classroom management and content delivery.
- This program has made me a better teacher and has reminded me that teaching science can be and should be fun for the students and the teacher. The students in my school love science and I hope this encourages them to get degrees in any field of science and/or math. I will be encouraging this and first and foremost, putting that idea into their brain.
- I have the ability to meet with other teachers from the area, share information, build a "family" is wonderful. Dr. Schroder from A&M collaborative has done a wonderful job. She has so much to share. I am a trainer of teachers with our collaborative and I love every minute. Thanks for all that you do for all of our

children and us.

- TRC inspires me to continue on the ever-ending path of betterment for students.
- The responsibility as a project director has pushed me to grow professionally this year. Working with awesome teachers and seeing how excited they are is a great motivation to me to work hard for them.
- I have not only become a better teacher, but I have improved my skills in working with adult learners and district personnel. I have also advanced my career because of my participation in the TRC. I have moved from classroom teacher and Science Teacher Mentor to ITM to Project Director and Science Curriculum Coordinator K-12 for a school district.
- It has brought me more knowledge to the Science and Math areas. I did not receive this much information during my university time, but now that I am in the classroom and using the content - I now understand and portray what I understand to my students.
- It has refocused me on the important aspects of teaching. It has also given me motivation to mentor other teachers so that the students benefit even more.
- The ideas and materials are very useful. The best part is the friendships I have formed and just talking to other math teachers. I don't feel alone.
- I would not have had the career opportunities without the leadership skills learned and content area support of the TRC.
- I have been a member of the OLLU TRC since 2008- 2009 school year, and the benefits my students, parents, and school community have received are amazing. I have been able to see my students knowledge grow as well as I grow to become the best teacher I can be.
- It has provided me the opportunity to share my expertise in my field and has allowed me to do networking with colleagues. It has allowed me to continuously learn from others.
- I am a teacher in the Galveston ISD and the Collaborative completely supported me as I began teaching a science class for middle school high-risk students (no budget, no lab). As a result of their efforts tremendous improvement in the science education of these most underserved students was met.
- The training that has been available for us to attend and grow professionally.
- I am hoping to collaborate with professionals who have the same passion about education that I do.
- I learned new activities that I can now go back and share with my teachers. It was so nice to be treated like a true professional. This was the first time I have attended and will come back for many years to come.
- The trainings provided create teachers who can create problem solving students who "do" math, rather than "do worksheets." The support is phenomenal
- If you have a few years, I could tell you. The TRC has helped me get my 2nd Master's, has made me not a good, but an outstanding teacher, it has helped me network with other great teachers, it has enriched my life with fabulous PDA for years, in all areas that I have taught. It has made me a mentor that has made starting teachers love teaching and stay in the teaching field. It has also made me want to help teachers that are starting out or teachers that may have idled in place for awhile.

- I feel that my teaching is much more powerful than it was before I became a MTM. I am more confident in trying new strategies as well as more creative in how I teach in my classroom.
- It's given me many different tools and perspectives for communicating concepts to students and teachers.
- TRC has enriched every aspect of my job. I have learned from high quality educators that are actually doing great science in their classroom.
- I look forward to using activities from the "What's eating my corn" session
- I am sharing my information with my fellow teachers and enriching all students learning abilities. It has given me insight on how to also include the math teachers in my projects.
- It gave me a TON of new ideas and methods to try to get my students more excited about math and science.
- It has given me great ideas on things that I wanted to get started but never knew how to start. I will be moving a lot of things toward technology and these sessions gave me some good ideas.
- I got many useful ideas for experiments and different approaches to teaching math and science.
- It makes me want to dream BIGger. Why do I limit myself or think there are things I cannot accomplish? I felt redirected back to the reason I became a teacher to begin with.
- The TRC provided me with a program early in my career that cultivated my leadership abilities and allowed me to express my inner Geek. Now, as a Project Director it allows me a network of professionals to collaborate with and a wonderful group of STMs to turn into leaders within their districts.
- New teaching ideas-collaboration with others-greater understanding of content
- The increase in my content knowledge has increased 10 fold in my 4 years in the TRC. Another great aspect is the increase in pedagogy strategies and the networking with others who have a passion for science.
- It has given me more ideas for my classroom this up coming year.
- It has strengthened my core knowledge. This, in turn, has built my confidence as an educator, which, in turn, has made me a better teacher.
- The TRC and especially Dr. Sognier have given me a "new lease" on teaching. I was thinking of seeking a different career path because I felt burned out trying to design new ways to teach to keep the classroom exciting and teaching subjects I didn't find exciting. When my principal found out how much I had become involved in the science collaboratives and how excited I was about the innovative ways to teach science I was learning, my principal has assigned the science curriculum for our grade level to me. I am once again excited about teaching. My co-teachers have remarked often how I am in turn transferring my excitement to my students. Thank you for such offering such a wonderful, inspiring program.
- It is the driving force behind what I do in the classroom. I also feel more comfortable sharing with my fellow teachers the latest in research and pedagogy.
- The training opportunities have been fabulous!
- Because of the MANY trainings I have attended, I have been re-energized and

able to take many new ideas back to my classroom. I have also been given many supplies for my room, which have added to my students' enthusiasm, too. They are always excited to see what I bring back after a training and are eager to learn what I learned. THANK YOU TRC!

- I have incorporated interactive notebooking in my classroom, used strategies for teaching ELL students and the use of vocabulary. My students have done well on the TAKS and my district benchmarks exams.
- I have been working with several teachers in and outside of my district. I have learned new ways to present troublesome issues.
- I have gotten more motivated, because of the sources and fellowship with other educators.
- I gained confidence and enthusiasm from being VALUED as a professional and as an educator.
- TRC has made a tremendous difference to me as a professional educator by giving me the opportunity to collaborate with school teachers through professional development and classroom observation. In addition, it has given me a sense of what happens in the classroom and how I can better provide professional development for teachers.
- It has helped me to use what I consider "best practice" in the classroom. Allowing for the hands-on and group activities that promote a stronger foundation for learning and to help make learning fun for the students. It doesn't matter how much I know but it matters how much my students know when they leave my classroom.
- It has given me opportunities with trainings, supplies, and teacher collaboration.
- I feel more comfortable in the areas of math and science. This conference has helped me empower my teachers and my students.
- Again, the network of professionals promoting mathematics in Texas.
- Provided many, many much needed materials to allow me to teach from the hands-on approach.
- Lots of wonderful activities to use with my students and share with my CM's.
- I feel that the TRC is helping to improve my efforts as a professional educator. The insight, support and collaboration received from my participation in the TRC is priceless.
- Empowerment, information, collaboration, clout, and resources.
- Volunteering for the collaborative is of great benefit to me. My local collaborative has great teachers, great programs and has allowed me to become involved in TXESS (Texas Earth and Space Science). Continuing education through the collaboratives allows us to share ideas and information, build community, and further our understanding of the best methods to educate our students and ourselves.
- The STMs who collaborate and mentor each other and the CMs at their schools are fantastic and inspiring.
- TRC has helped motivate me to add new technology and innovations to my classroom.
- Connections

- Working with and learning from other members in my collaborative has helped me immensely in the classroom. The workshops I regularly attend through our collaborative gives me new ideas and manipulatives I use in my classroom.
- I enjoyed working with a small group of teachers throughout the year.
- It has made a huge difference in how I teach math. I learned so much about how students think about numbers and how to lead them to make generalizations and connections. I can't wait until next school year when I can begin implementing this manner of teaching from the beginning of the year.
- Providing sustained professional development was a new concept for me. I think we have had a tremendous impact on teaching and student achievement, as evidenced in teacher evaluations of the sessions and their teaching.
- It has made me a better specialist and teacher. It has influenced how and why I use the strategies I now use. I also have grown intellectually in the area of science.
- The TRC has helped me keep current with state information. I have met quite a number of people who have helped with my profession development. The networking is great. I really liked seeing what other groups were doing in the Showcase and Reception.
- I now have access to a vast network of Texas educators that work together for the common thread of Excellence in Science and Math Teaching.
- Every time I have a session I am so excited to get back to my classroom and teach. Also the ability to have the supplies to teach with hands on learning, not just simply using the textbook. In turn my students are excited to see what I have learned and they can't wait to get their hands on my things and explore and learn. Thanks so much!!!
- It has contributed depth, richness, and quality to my work. It's the best group that I'm associated with.
- I realize I am not alone and I have a group of teachers willing to help and give suggestions even though I am at a small school.
- WOW! It has kept me current and empowered me to collaborate with the community and other teachers.
- The TRC has helped to make me a professional educator. It has given me the ideas, courage, and supplies to do handson science and math in my classroom. I would be just a textbook teaching teacher without the TRC. I am so glad you have added the math collaborative as well. Thank you for all your hard work. I would also like to thank Sara Flusche and Lisa Bellows for their personal assistance in helping our collaborative become effective teachers.
- I have learned new strategies to use in my classroom.
- The TRC has helped me grow professionally. I have gained a tremendous depth of knowledge in teaching math. I had previously been a literacy specialist. I have also had wonderful opportunities to teach others in my profession about the things that I have been learning.
- The opportunity to present to caring educators and learn how to teach adults as well as participating in many additional learning experiences that impacted my own teaching and gave me new ideas to share.
- I have always been a good teacher but the TRC has made me a GREAT teacher.

I am very confident in my knowledge.

- It has allowed me to interact with many teachers and understand more their teaching challenges.
- The TRC has made it possible to reach more teachers on a personal basis. It has also made it possible for my teachers to see they are not alone in their beliefs about math education. In some of the smaller districts, they tend to be isolated from others who feel education should change.
- Provides excellent professional development and a wonderful, resourceful learning community.
- The TRC has brought my teaching career to a whole new level. The emphasis on professional development has expanded my knowledge and given me immediate tools to use in the classroom. The TRC has energized me in countless ways and has directly benefitted the students that I have in class because I have more knowledge about science concepts plus countless ideas to expand my curriculum.
- There are so many people that are willing to share ideas that are easily transferable to the classroom. The extended training offered that is student centered helps to keep the focus on what is important, our students.
- Connections across the state to great resources and people; enhanced learning about K-12 STEM efforts and education
- Encouraged and inspired me. I feel obligated to help my fellow teachers.
- It has provided me with the opportunity to see math education from a broader perspective and provided very critical contact with TEA.
- The TRC has allowed me the opportunity to begin mentoring other teachers and training. It has given me my first opportunity to present at a conference (this annual meeting).
- Last year was my first time to attend and I got so many ideas. I used most of them in my classroom during the year. This year was the same thing. I am hoping to be able to get the TAME trailer to come to my school. Thanks for all your support!
- It has opened many doors for me to explore outside of my small 1A school for help and ideas for my struggling students.
- The collaboration with math teachers across the state has given math an excitement as never before.
- It has empowered me to make a difference to the students and other teachers by being the best teacher I can be and to continue to grow.
- The TRC raises the bar for all teachers across Texas. After three years of participation I have received educational opportunities that otherwise would not have been possible and I have been challenged professionally. The efforts of the TRC staff are recognized and greatly appreciated.
- It has opened an avenue for quality professional development with the aim of building teacher leaders.
- I am bringing back to my campus great ideas from some of the break-out sessions that my students will truly enjoy! My favorite session was the one on math games. Great ideas on how to make math games out of simple games like "Don't Break the Ice" and "Kerplunk"!

- The TRC has provided me with the opportunity to learn many things in regard to mathematics which in turn has benefited the teachers that I serve.
- It has provided me the opportunities to improve my teaching skills and to bring those experiences to my students.
- I now have more clear and enthusiastic vision of myself as a mathematics mentor/coach.
- Through TRC, I have made new friends who I can also treat as colleagues and through these relationships have gained phenomenal resources.
- It has provided me with a networking tool to see how things are working or not working with other teachers.
- The TRC has done so much to help me become a better science teacher. Without the support of the collaborative I don't believe that I would have accomplished many of my professional goals.
- I got several good ideas that I intend to bring back to my campus. I learned things that will improve my ability to meet the needs of my students.
- TRC was tremendous experience where we can relate math, science, and technology. I enjoyed this conference.
- I attended the meeting to learn more about the TRC because both math and science fall into my department.
- Doing a presentation was a wonderful experience. I received lots of wonderful information from other educators as well.
- I have learned great ways to engage my students
- The various sessions and interaction with key figures in science education always help in developing a more professional and more comprehensive program of teaching science and math in the state.
- I feel more confident about sharing my ideas with others, as now I realize that even I can have something others may want to use. I have learned from others so long and made my own little tweaks that now I have something to share too. Pay it forward.
- TRC provides continuous implementation of tools that advance student learning and enhances my skills as an educator.
- It has shown me the benefits of professional networking and the power of science professional development.
- Given me inspiration, confidence, and tools to continue great teaching in my classroom. I feel for the first time respected for being a teacher. I love that I have chosen this profession. Thank you for the boost.
- The TRC has provided me with valuable training to share with teachers in the Region 5 Area.
- The TRC has been very instrumental in shaping my content understanding in science and played a key role in my National Board Certification Process. It has also made me a strong advocate for science instruction for my district and the elementary campuses I serve as an Instructional Coach.
- Being involved with the TRC has provided a network of people involved in enhancing education.
- Continued professional growth.

- I have learned so much about pedagogy that I never got in school or in other professional development. I have refreshed content knowledge, but, more importantly, I have learned numerous ways to make the content more meaningful and engaging for my students.
- Allows collaboration between a variety of disciplines. (University, Regional Center, State leaders, Classroom teachers)
- I am much more secure in teaching Science and helping other teachers with their Science lessons.
- Professionalism is celebrated.
- Raised my level of awareness and helped me to do the same for others.
- Curricular material for the classroom
- We are just getting started but I have learned so much over the past two years and have gotten so much inspiration from my fellow educators. Teachers naturally want to be the best that they can be so taking inspiration from each other, gives us the will to continue trying to help our students and the desire to improve our teaching skills.
- TRC has provided me with more ideas for my classroom and motivated me to try new things and apply for grants in technology to be able to do more in my classroom. It has also helped me connect with coworkers to help them with what I have learned.
- It has made me see more why we need to teach cross-curriculum and tie in other subjects.
- Any time teachers have the opportunity to collaborate with other teachers and share experiences and teaching strategies, they are able to take it back to the classroom to improve their teaching.
- The TRC has opened doors of opportunity for me to grow as a teacher leader by providing opportunities to not only mentor other teachers but learn from them and grow with them. I was the "mentor," but I think that I learned just as much, if not more, from the "mentees." The most exciting part is knowing that because of these collaborations, students in our region are experiencing more science and more success.
- Empowered me with science ideas that I have used to help build a love of science in my classroom.
- It's providing the time and resources to provide the kind of support that I want to provide for teachers over long term.
- The TRC has made a tremendous difference in me being a professional educator by giving me opportunities to experience Science Concepts that I am teaching i.e., Rivers, GLOBE, PLT. The TRC has provided me Professional Development as well as resources to use in my classroom. You have an opportunity to learn some things you didn't know and refresh yourself on some things you may have gotten behind on. I recommend it to all Science Educators.
- The TRC has supported me with my Galveston County Regional Science Collaborative by making me a better teacher. I am a life long learner always looking for a way to make teaching and learning better for me and my students. There seems to be always someone who has done what you are trying to get your students to know and a different way to do it.

- I have enjoyed being able to collaborate with other teachers from other schools. Being able to work together and learn together has been fun and enlightening.
- It has given me confidence in my teaching, I am in a graduate program with great mentors, and I am loving what I do.
- Has given me a better understanding of professional development in developing good teachers.
- I believe it has given me a broader understanding of the science field and made me a more effective teacher. I was voted 'Teacher of the Year' at my school because of the enthusiasm I bring to the science lab classroom and the impact I have on my campus. I know the TRC science collaborative has been a large part of my professional growth and success.
- TRC has helped me as a professional educator to use creative and constructive practices for teacher professional development and subsequently student's educational attainment.
- Where to start! Coming back to teaching after 15 years away from it made me a new teacher all over again. Donna Wise was a Godsend with her help and encouragement. I always enjoyed every meeting and learned SO MUCH from them. Much of what I got at the meetings I took to the classroom. Some things I'll introduce this year. Without Donna & the TRC, I doubt seriously that I would have the desire to continue on with my teaching career. I really think I would have floundered & would have given up. Thanks to Donna & TRC I have a passion to teach & am anxious for the new year to start!
- I have taught for 12 years, but just taught from a textbook or what was given to me by my peers. Using the information learned in the collaborative this year, I am finally teaching the way students learn
- By supporting the fact that I am a professional and providing many opportunities to improve the content my students receive. The opportunity to participate in the TxESS Revolution has been wonderful. My local collaborative also provides opportunities to expand what my students can learn in meaningful ways and brings me into contact with teachers from other local districts and who teach grade levels which means that my professional conversations are about vertical relationships in teaching rather than solely focused on my content and grade levels.
- It has given me the opportunity to work closely with many science educators in my region and across the state.

Teacher Content Knowledge

One of the primary goals of the Texas Regional Collaboratives is to improve the science content knowledge of participating teachers. Each Regional Collaborative creates a Professional Development Program to address the unique needs of the teachers who participate in that region. Regional Collaboratives may have a slightly different focus each year depending on the specific grade level of teachers that participate and a regional needs assessment. Needs assessments generally include an examination of student TAKS scores as well as local data such as district benchmarks to identify areas in need of instructional improvement.

Many of the Regional Collaboratives developed formal procedures for identifying changes in teacher science content knowledge as a result of TRC training. These Collaboratives administered 77 different tests in a pre-test/post-test format. Test content covered a range of topics including physics, chemistry, biology, earth science, and science process skills. The impact of TRC Physics professional development on the content knowledge of teachers is summarized in Figure 25. Pre-test mean scores and post-test mean scores were averaged for all exams resulting in a mean score of 64% for all pre-tests as compared to a mean score of 73% for all post-tests.

Physics Assessment

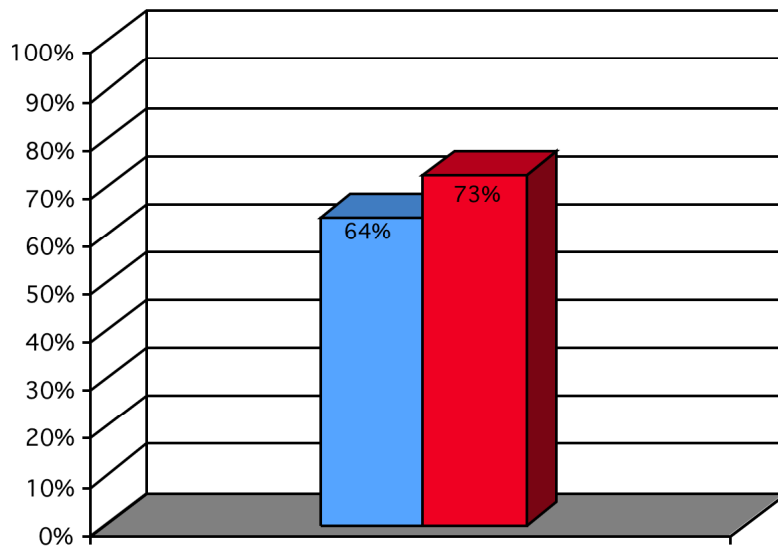


Figure 12: Improvements in STM Science Content Knowledge
There is appreciable and significant 9-point gain in the teacher content knowledge.

The Texas Regional Mathematics Collaboratives developed formal procedures for identifying changes in teacher mathematics content knowledge as a result of TRC training, and their own research into valid reliable assessments of teacher knowledge. Assessments used were instruments developed from the Learning Mathematics for Teaching Project, the Diagnostic Mathematics Assessments for Elementary Teachers, and in some cases customized project-developed assessments.

More than 14 of the 24 projects administered the assessment in a pre-test post format. Test content included algebraic concepts, geometric concepts, and whole number operations. The impact of TRC Geometry professional development on the content knowledge of teachers is summarized in Figure 26. Pre-test mean scores and post-test mean scores were averaged for all exams resulting in a mean score of 47% for all pre-tests as compared to a mean score of 53% for all post-tests.

Geometry Assessment

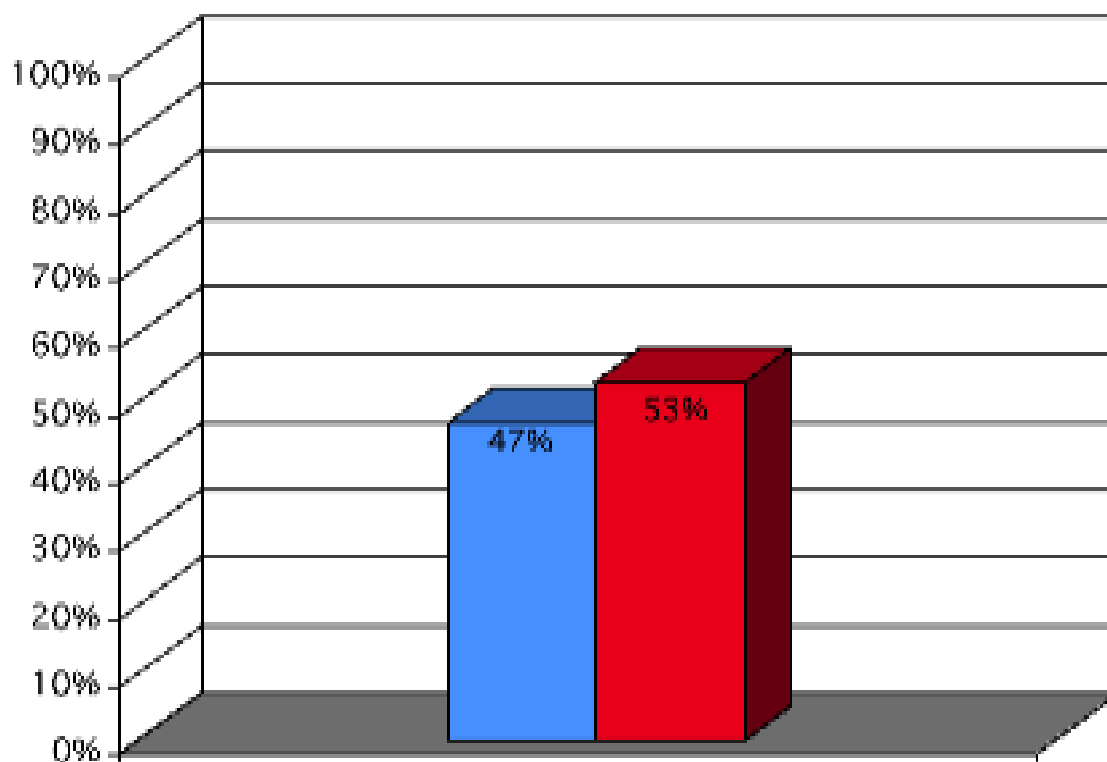


Figure 13: Improvements in MTM Math Content Knowledge

There is appreciable 5-point gain in the teacher content knowledge.

Student Impact

One of the most difficult tasks for professional development evaluators is to determine the effect teacher professional development has on student achievement. This is particularly challenging for a large statewide organization that serves teachers in over 800 independent school districts, charter schools, and private schools. With the implementation of the Elementary Science Texas Assessment of Knowledge and Skills (TAKS) test however, evaluators at least have a common metric by which to measure statewide student performance.

Rice University 5th Grade Science TAKS

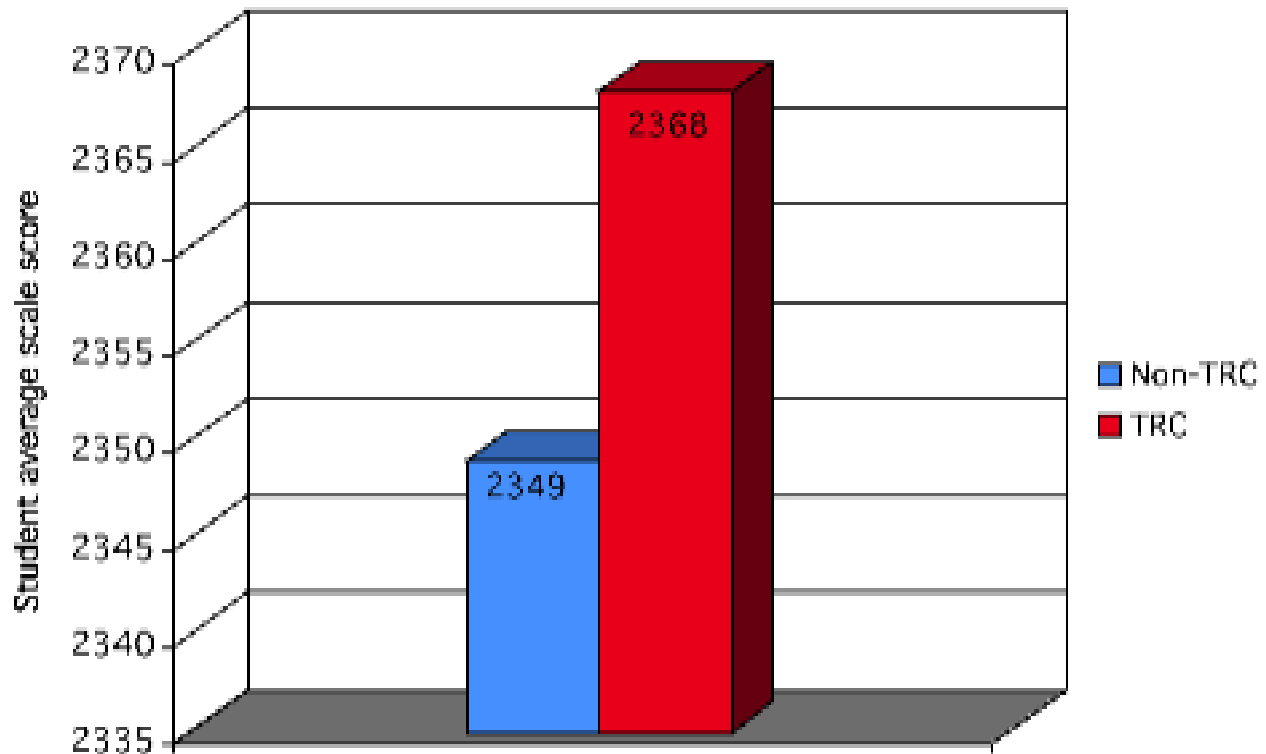
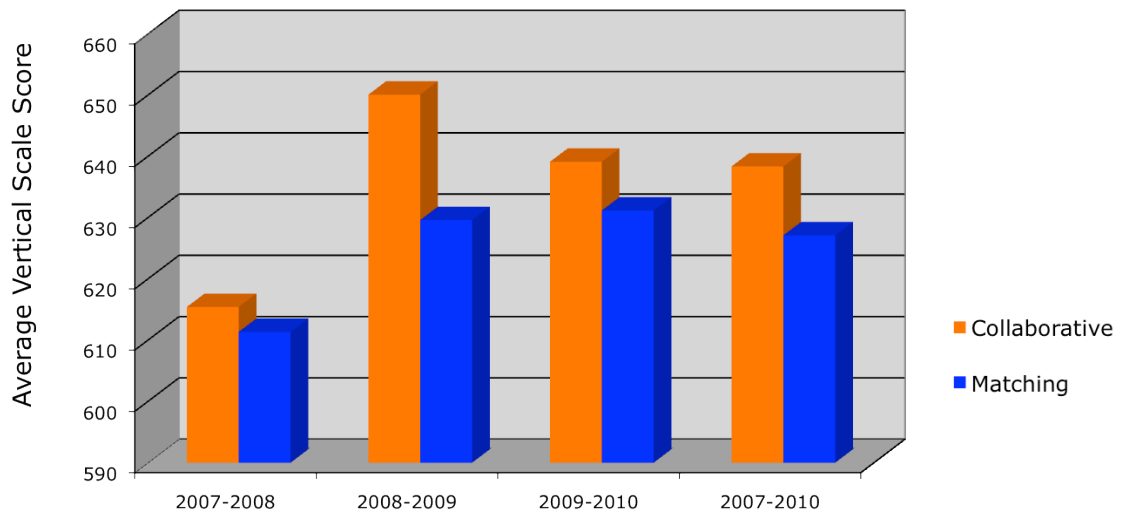


Figure 14

UT Tyler 4th Grade Math 2007-2010 TAKS



Mid-Career Teacher Recruitment 2009-2010

The University of Texas at San Antonio and The Texas A&M University System were granted \$512,000 for the period of May 1, 2009 to July 31, 2010 to plan and implement the recruiting, training, certifying, and mentoring professionals with a STEM degree to become science and mathematics teachers in high-needs districts in Texas.

The University of Texas at San Antonio utilized the \$200,000 awarded for an initial planning period and to implement the certification program for 8 participants.

The Texas A&M University System was awarded \$312,000 to plan and implement their project for 62 participants at 8 separate campuses:

- Commerce – 6 students
- Corpus- 1 student
- PVAMU – 4 students
- TAMU – 9 students
- TAMU – 13 students
- Tarleton – 4 students
- WTAMU – 7 students
- Texarkana – 18 students

Challenges and Successes

Professional development academies (PDA) that were offered to all the regional science and math collaboratives of the Texas Regional Collaboratives (TRC) during the 2009-2010 school year encountered both successes and challenges. By evaluating the positive as well as negative aspects of PDAs, the feedback can help in refining PDAs to better serve the teachers who participate in them. The majority of the science and math collaboratives stated that the main successes of PDAs led to four major improvements in teacher learning and development: (1) teachers were successful because they worked in groups to learn the new teacher materials and procedures that would be implemented in their classrooms, (2) teachers implemented learned science and math activities in classrooms and stated that they were being successful with their students, (3) teachers demonstrated an increase in overall positive attitude toward science and math content with which they were not comfortable initially, and (4) teachers showed an increase in knowledge and implementation of technology.

These successes were documented through surveys from participating teachers that highlighted the positive aspects of the PDAs that were offered. Attendance and participation at the PDAs were high as a result and the resources given to the teachers at the sessions were used effectively in the classroom. Moreover, participating teachers had requested that more workshops and training sessions be scheduled which can help lead to further opportunities to increase their knowledge base, teaching strategies, and instructional resources not only for their own classrooms but also to train their colleagues. This effect, in turn, has positively impacted the school districts the teachers work in since the resources and training provided by the TRC has supplemented the district's own standard curriculum and professional development opportunities. As one regional science collaborative stated: "This collaboration has fostered a spirit of collegiality and cooperation between the school districts, the local partners and the university (and that) these linkages strengthen community ties and build local capacity so that teacher knowledge and skills can be improved, thus increasing student achievement levels."

Challenges, on the other hand, that the regional collaboratives encountered during the workshop and training sessions were relegated to logistics. For example, the scheduling of PDAs to meet the needs of both school districts and teachers were the most cited challenge by the collaboratives. Limited participation of some local school districts hampered some teachers to find the time, as well as substitutes, from attending workshops. Principals were sometimes unwilling to allow the teachers from their classroom duties thereby hampering attendance for some collaboratives. Some regional collaboratives reported not being able to qualified individuals to attend the workshops that were offered. In these instances, the teachers were not able to effectively translate and teach the materials to colleagues back at their home schools.

Although the majority of challenges stated by the participating collaboratives were related to logistical concerns in terms of scheduling and finding the right teacher to attend the PDAs, one major challenge reported dealt with the general content of the workshops that were offered. In the words of one project director, the “PDAs offered have very good science ideas but they all lack some important components that would help them become effective tools for each collaborative to gauge the growth of students’ and teachers’ in the serving districts.” Furthermore, the following four areas highlight the general concerns that the collaboratives had in terms of what the individual PDAs were lacking: (1) Analyzing student work or campus’ scores to identify particular weaknesses, (2) selecting from the limited number of skills or topics as priorities for improvement, (3) identifying the instructional resources needed and the appropriate models that will help the needs of the instructional priorities, and (4) having a monitoring tool available with each PDA to help assess the improvement of teacher and students that are exposed to the implementation of the specific professional developments.

Conclusion

The achievements of the Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching during the 2009-10 funding period have been extensive. The TRC decreased the number of Science Regional Collaboratives to 36 and added 2 Regional Mathematics Collaboratives for a total of 24 across the state. Each Regional Collaborative consisted of a partnership among numerous organizations and stakeholders with a vested interest in quality science instruction including institutes of higher education, school districts, charter schools, private schools, Education Service Centers (ESCs), and business and industry. During the 2009-10 grant period, **56 Institutions of Higher Education** partnered with Regional Collaboratives across the state to provide high quality science and mathematics teacher professional development.

Unfortunately, while much has been accomplished by the Texas Regional Collaboratives over the 2009-10 program year, the services provided represent only a fraction of those needed for the 135,000 elementary teachers and the 32,000 secondary science and mathematics teachers in the state. During the 2009-10 grant period, the TRC will continue their commitment to excellence to increasing student achievement through increasing teachers’ content knowledge and pedagogical skills.