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Increasing Teacher Involvement with Other Teachers Through Reflective Interaction

Tina Thompson
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Math in the Middle Institute Partnership
Action Research Project Report

In partial fulfillment of the MAT Degree
Department of Mathematics
University of Nebraska-Lincoln
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Increasing Teacher Involvement with Other Teachers Through Reflective Interaction

Abstract

In this action research study of a district's mathematics teachers, the researcher investigated how teachers interact with other teachers in their building and throughout the district. The researcher wanted to know how deeply teachers thought about teaching mathematics, and if they use other teachers in the district as a resource to help with unknown math problems. The researcher discovered that some teachers are willing to interact with others, but would like to have time supplied to them during the school year's staff development meetings. The teachers involved were able to observe each other teaching and take valuable strategies back to their own classrooms. As a result of this research, the researcher would like to see this study continued next year during staff development time. The support of the district and staff development are key to the success of this study.

The topic of this action research was how teachers interact with other classroom teachers. The researcher questioned if teachers viewed other teachers as a resource to help them become better teachers of mathematics. Teachers have spent most of their time isolated from other teachers. They are placed in a position of authority with students daily. They are expected to be competent in what they are teaching; therefore, teachers have felt they only have themselves upon which to rely.

Working with teachers in the district, the researcher knows how hard it is for them to allow someone into their rooms when they are teaching. They have viewed this as an attack upon them personally, and feelings have been hurt. They have been expected to conduct class daily, without incident, and with perfection. They are monitored through lesson plans. Teachers at the elementary and high school levels had little time to spend working with other teachers of mathematics. The middle school teacher had the most scheduled time to work with another math teacher -- once a week.

Teachers have attended staff development and have found it difficult to bring practices back into the classroom. They had good intentions of changing how they taught, but often teachers have gone back to the routine that was set in the classroom before they left. Teachers have felt badly about not being able to apply strategies they have learned. Some teachers have gone back to the classroom and changed parts of the way they have taught. Others have gone back, shut the door, and continued to teach the way they have taught in the past, as they think that this is the best approach for the students in “their” classroom.

Problem Statement

This topic is worth knowing because teachers have been asked to focus on more things in their classrooms. Many teachers have found themselves working harder, not smarter. There has

to be a way for teachers to be able to share the amount of workload expected of them. There is no sense in making each teacher of sixth grade math align the year's curriculum to state standards. They should be able to work together and rely on each other's professional expertise to get the job done.

This is a serious issue to examine, as districts have teachers who have become burnt out. They no longer enjoy their job, students, or even staff. They are now just bodies in a classroom, just getting by until they can find something else to do. Schools have forced good teachers into early retirement because of all that is expected of them outside of their regular teaching duties.

With additional job assignments teachers are given throughout the day, many teachers are exhausted at the end of the day. They have answered numerous questions, regulated the hallways, kept order and control in the classroom, broken up a fight, helped locate lost items, done lunch count and so on. When teachers hit the end of their day, most of them have not taken time to reflect on how effective their teaching was for that day.

Challenge

The challenge that many teachers face is time. The researcher will explore how one can provide more time for teachers to reflect on their teaching practices of mathematics. Many teachers find themselves in teaching ruts. They are stuck using the same old approach each day, and are not really sure how to change that. With little or no time for reflective thinking, teachers are doing their best at teaching what they know.

Literature Review

A review of the published literature related to teacher involvement and reflective practices has revealed that most studies talk about collaborative time, staff development, and learning communities.

Collaborative Time

Teachers are in need of many things. Time seems to be the most valuable. There is a difference of practice in the amount of time teachers need to collaborate. One model shared by Calderon, who is a research scientist with the Center of Research on the Education of Students Placed at Risk, of Johns Hopkins University (1999), had the teachers meeting once a week for two hours a day over the course of a year. Pfeiffer and Featherstone, both on the National Center of Research on Teacher Learning of Michigan State University (1997), had teachers meet once a week for three hours for several years. Zech, Gause-Vega, Bray, Secules, and Goldman, of the Learning Technology Center of Vanderbilt University (2000), had a group of teachers meeting once a week over 10 years.

Stevenson, a professor of Psychology at the University of Michigan, Lee a graduate student of Psychology at the University of Michigan, and Chen, an assistant professor of Social Ecology at the University of California, studied the differences of Japanese, Chinese, and American students' scores in math and reading. They made a profound statement:

> Although time is needed to help improve student outcomes, how that time is spent is a very important aspect as well. American schools may be fulfilling the roles expected of them by the American public, but its expectations prove to be insufficient when judged by international standards--American students received significantly lower scores on the curriculum-based mathematics test than their Chinese and Japanese peers (Stevenson, Chen and Lee, 1993 p. 6).

Here they explained that it is not enough to just give more time to teaching math or reading. How math is taught to students makes a difference in how students will perform. Perhaps the emphasis in an American classroom should not be on what the American public thinks, rather it should be placed on what and how math should be taught.

Staff Development

A district will give their teachers staff development time on how to better teach a math series they have just adopted. Many districts do not give their teachers staff development time on how to come together as professionals and push to become better mathematics teachers. This is something that will take money and time to create and execute. "In addition to weekly meetings throughout the school year, teachers had a yearly weeklong summer institute where 80 or more teachers explored issues further with researchers and cooperative learning facilitators" (Calderon, 1999, p. 5).

Staff development allows teachers to gain knowledge. Cochran-Smith, the John E. Cawthorne Millennium Professor of Teacher Education For Urban Schools from Boston College, and Lytle, an Associate Professor at the University of Pennsylvania Graduate School of Education, view knowledge in three ways: "knowledge-*for*-practice" is referring to theory, "knowledge-*in*-practice" refers to practical knowledge, and "knowledge-*of*-practice" refers to a teacher's ability to teach students effectively (1999, p. 6). Theory is looked at as something teachers learned in college. Practical knowledge is gained from experiences in the classroom. Teaching students effectively comes from teacher collaboration.

Content knowledge is expected of mathematics teachers when they graduate from college. Staff development is rarely based on increasing teacher's content knowledge. Zech et al. found that "teachers had not made a shift from defining content understanding as the execution of procedures and skills and the accumulation of facts toward underlying concepts and principles in the content areas" (2000, p. 2).

Learning Communities

State and national standards have offered continuity among classrooms to ensure that students have been taught the same skills. Lewis and Perry, who are conducting research for the Department of Education at Mills College in Oakland, California, and Hurd, who is a cofounder of lesson study effort in the San Mateo-Foster City School District in California, believe "a lesson study is not about improving a single lesson, it's about building pathways for ongoing improvement of instruction" (2000, p. 1). Teachers need continuous interaction to improve instruction. Improvement comes from improving multiple lessons over time.

Once collaborative time and the training on content area is in place, teachers must come together and begin to communicate with each other. Pfeiffer and Featherstone state:

> Asking teachers to engage discussions for mathematics in ways that provoke and value open disagreement means asking them to articulate their understandings about a subject matter that looms as a foreign and intimidating territory to be avoided. It means asking them to break with familiar and supportive norms while trying to create a new practice in an area where their intellectual self-confidence is likely to be fragile (1997, p. 6).

Calderon believes that through learning communities, "teachers learned to let go of their fears and invited each other to observe their classroom instruction" (1999, p. 3).

The researchers talked about how teachers are in need of more time to be reflective in their thinking on how a lesson was presented to students. They expressed a need for a safe place for teachers to work together and challenge each other and self about teaching practices. The researchers also felt that Learning Communities are groups that can be formed to help guide teachers in this. The authors gave examples of how they set up and studied Learning Communities. They shared data that resulted from the studies that lasted a year or longer.

This research project differs from the published literature in several ways. This research will be looking at how more time to work collaboratively can be given to teachers when there is no Learning Community within the district. The researcher will be looking at how teachers view and use advice from other teachers in their classrooms. While this research investigates classroom observation, most published research instead investigated Professional Learning Communities. Stevens, Chen, and Lee (1993) compared Japanese, Chinese, and American students' scores in math and reading and then tried to understand why American students' scores were lower. This research did not include any students' scores. With this research, perhaps some groundwork can be presented to districts that addresses how to prepare teachers for the idea of Learning Communities.

Purpose Statement

The purpose of this study is to increase teacher-to-teacher interaction about mathematics. Teachers are often placed into a classroom and are told to teach. They do so to the best of their ability. There are times that a teacher may have to answer the question of, "Why do we have to know this?" The answer is "because there is a test over this next week." Perhaps if that teacher felt comfortable going to another teacher and asking for ideas and suggestions, he or she could have piqued the student's interest a bit more than just passing or failing math class.

The researcher began to look at three questions:

1. How do teachers perceive other teachers?
2. How does one challenge teachers to become more in-depth thinkers about how they teach math to students?
3. How does one encourage (prepare) teachers to become a part of a learning community?

By looking at these three questions, the researcher is hoping to gain insight as to how a district can better provide staff development to their teachers.

Method

The researcher began by sending a formal letter inviting any teacher who taught math, 3rd grade through Algebra I, to become a part of the study dealing with teacher interaction within the school district. There were forty teachers eligible to participate, and six agreed to be interviewed twice, observed twice, and observe another teacher once.

The initial interviews were given on February 22, 27, and 28, 2007. Due to snow, flu, and parent-teacher conferences, it was hard to get a chance to see all of the teachers before this time. The researcher had a list of questions (see Appendix A) which was asked of the teachers and recorded. Once the researcher was able to interview all the teachers, it was time to visit classrooms for observations.

The researcher constructed an observation form called Time for π (see Appendix B). This form put teachers' minds at ease while being observed. There is a fear that an observation is an evaluation. The researcher left the form very open and direct with nothing to hide from teachers. The observation form was copied and presented during the conference with the teacher. Going through the form together and chatting about certain observations that were made allowed for collaboration. By the time the conference was done, teachers were breathing a sigh of relief because, "That was not as bad as I thought it would be" (Researcher's Observation, April 3, 2007).

All of the classroom observations the researcher conducted took place the week of April 2-6, 2007. Again, due to other duties within the district and breaks in our school calendar, the researcher was unable to observe before this time. The researcher went into math class and sat at the back of the room while the teacher taught math. Notes were taken on the lesson being taught

at that time. Feedback was provided that consisted of positive comments and suggestions. Questions were included to help the teacher be reflective about teaching math.

The next step was figuring out who was going to observe whom. In this study, there were no teachers from the same grade level who volunteered, and two teachers taught in an elementary building together, and two of them taught at the middle school together. The researcher decided to pair 3rd and 4th grade together, 5th and 6th grade together, and 8th and Pre-Algebra at the high school together. By doing these combinations, teachers were able to get out of their buildings and into a classroom either directly above or below their grade level. The researcher was able to cover two classes a day during April 16, 17, and 19 for teachers so they could observe.

The teachers then went to each other's classrooms and observed a math lesson. They were able to take notes on the lesson and provide feedback on the Time for π forms. These forms were again full of positive comments made to the teacher providing the lesson. Again, there was at least one question at the bottom that the observer wanted more information about. Once the forms were filled out and turned into the researcher, a copy was made for research data and then given to the teacher who was observed.

The exit interview was recorded and took place May 1, 2007. Everyone was interviewed on that date. Exit interview questions (see Appendix C) were close to the same as the initial interview questions. It was pointed out that the responses should pertain to their experiences after participating in this research. Questions were also included asking if they would like to have an opportunity to work with other teachers more often and how that might take place.

Transcriptions of the interviews were color coordinated under each question asked, one color for each teacher. After reviewing research questions, the researcher began to look for

evidence. Questions 1-5 on the initial interview were focused toward insight for the first research question. Questions 6-8 were focused on the second research question.

During the exit interview, questions 1, 2, and 5 pertained to the first research question. Questions 6-8 were directed at the second research question. The third research question was the most difficult, so question 3, 4, and 9 were directed more at that question. It was hard to know how to prepare teachers for a lesson study if they had never been an observer of a classroom before.

The researcher kept a weekly journal from February 22, 2007 to May 3, 2007. It was used to write about how the process was progressing. "Another short week. That makes it difficult to get into classrooms for observations. Teachers and students are feeling the crunch on time." (Personal Journal, March 15, 2007). This statement sums up the frustration felt by the researcher while trying to collect data. Between short weeks, and the third quarter ending, it was extremely difficult to get into classrooms due to duties the researcher had with the district job.

Once all the data was collected, the researcher then constructed a spreadsheet to help organize the information (see Appendix D). On each sheet the researcher put one research question. The information was then collected and sorted from the three data collection procedures: interviews, observations, and journal entries. From this information it was easy to begin to put together analytic memos to further examine the data.

Findings

Results of the project were positive. First, teachers who participated in the study viewed other teachers as a resource to help teach mathematics. Secondly, they need interaction with other teachers multiple times in order to challenge themselves and others to higher levels of mathematical thinking. Finally, they would be willing to work in a professional learning

community if there was support and guidance from administration, and if participation was not mandatory.

How do teachers perceive other teachers?

According to the initial interview conducted in February 2007, teachers were seeking out other teachers' ideas on how to teach a math lesson about once a week. They felt they were able to meet with a same grade level teacher daily, weekly, or monthly and from those meetings they took back ideas to their classrooms and applied them. Teacher 6 felt she only met with her grade level teacher on a need-only basis but would take those ideas back and apply them. All of the teachers expressed that they rarely or never got a chance to work with other grade level teachers and had never asked their principal for thoughts or ideas on how to teach math.

Upon the exit interview, conducted in May 2007, Teacher 3 and Teacher 4 felt they had increased the number of times they sought out other teachers' ideas and thoughts on how to teach math. The other teachers felt they still sought out others' ideas about once a week. Teachers still did not ask the principal's thoughts or ideas on how to teach math. They all did experience working with another grade level teacher after the observations. All but Teacher 6 felt they had brought back many of the ideas they had seen in the observed classroom.

The researcher's observations made in April 2007, showed that Teacher 1 was applying strategies learned from a summer training that was provided by a teacher from the district. Teacher 2 was doing an activity that was team-based which included Language Arts, Math, Science, and Social Studies. Teacher 3 was using a unit that had been created by herself and another teacher from the same grade level. Teacher 4 was using terms with students that were suggested by the resource teacher when they team-taught. Teacher 5 was using a suggestion from

a different observation. Teacher 6 asked the observer a question on how to solve a problem while teaching the lesson.

The teachers' observations, made in April 2007, showed that Teacher 1 was using a timer to stay on task. Teachers 2 and 5 were using small groups while working on math problems. Teacher 4 was thanked for giving the observer an idea to use in his or her own classroom. Teacher 6 had students going to the board to work on problems and explain how they got the answer they did -- a suggestion from an earlier observation. Teacher 3 was working on a unit created with another teacher.

The journal kept by the researcher from February to May 2007 supports that teachers do perceive each other as a resource to help teach mathematics. "I was excited to see one teacher had taken a suggestion and applied it to the classroom! The teacher was much happier, and the students were more responsible for their learning" (April 5, 2007). "Teachers can get out of their buildings (never done) to see how the other side teaches" (April 19, 2007). "Teachers came back with observation sheets filled out and smiles on their faces. I really think they enjoyed their time" (April 26, 2007).

With three different instruments: interviews, observations, and journaling, it is clear to see that the teachers who participated in this study perceive teachers as a resource to help teach mathematics. They sought out and met weekly with same grade level teachers. They gained class worthy ideas while observing a vast amount of teacher experience in other buildings. They are applying those ideas in their own classroom to help all students succeed.

How do you challenge teachers to become more in-depth thinkers about how they teach math to students?

According to interviews conducted in February and May 2007, one teacher had decreased, two had increased, and three had stayed the same on the amount of time they spent

working on lesson plans. Time spent on lesson plans was anywhere from 10 minutes to 2 hours per day. All of the teachers used formal and informal assessments of their students to determine the success of the math lesson. There were three teachers who had participated in district professional development, and two of those had also participated in state professional development. There were three teachers who had done no professional development in math all year.

Observations conducted in April 2007 had reflective questions that deal with multiple facets of the classroom. Teacher 1 was asked, “When planning your lessons and thinking about assessing the level of student engagement, what things do you consider when choosing activities that will maximize time on task and therefore enhance student understanding?” (April 5, 2007). Other questions were presented that dealt with more thinking about math and about teaching or classroom strategies. “When ordering fractions, have you tried LCD?” (April 19, 2007) pertains more to thinking about math. “How do you decide your groups?” (April 16, 2007) deals more with thinking about classroom strategies.

The journal kept by the researcher from February to May 2007 provides evidence that teachers are becoming more in-depth thinkers about mathematics. “Most interviews opened themselves to other chances to question me about mathematics or a lesson they had taught” (March 8, 2007).

> I observed, and then asked questions or gave suggestions on how to present something they were working on. Each teacher had a reflective question dealing with math questioning skills or grouping of students. Most of the teachers found the observations interesting. Statements like, “I didn't know that.”, or “Yeah, I am bad about that,” were shared. They were somewhat hesitant to sit down and go over the observation, but afterward, they were happy and thankful (April 12, 2007).

In February and March, teachers only did reflective practices with the researcher. Once they got into April, they were beginning to challenge each other to think more mathematically when observing each other. The teachers who participated in this study became more in-depth thinkers of mathematics and teaching. They enjoyed being observed after they were able to go through the process once. They were thankful for the praise they received from the observer and willing to answer questions that resulted. Teachers then began to implement changes in their classrooms and lessons based on conversations about the observations.

How do you encourage (prepare) teachers to become a part of a learning community?

In the interview conducted in May, five out of the six teachers expressed they would be willing to participate in a learning community built of other teachers in the district who would sit down and focus on teaching issues related to math. Teacher 6 expressed a possible interest. All of the teachers, except Teacher 5, suggested that teachers get an opportunity to work with other teachers, both in the same and in different grades, or in different buildings during the staff development days. Teacher 2 and Teacher 5 suggested meeting either before or after school. Teacher 2 and Teacher 4 suggested meeting during the summer time. In order for this opportunity to be accomplished, teachers 1-5 suggested administration would be vital. Teacher 1 and 6 felt teachers and buildings could provide this opportunity. Teacher 6 also felt that the District would have to help organize the professional learning team.

During observations conducted during April 2007, teachers were willing to work with others, ask for help, and apply other teachers' ideas into their classrooms. Teacher 2 and Teacher 4 were using suggestions supplied by resource teachers. Teacher 6 had students up to the board to explain their work, which came from an observation. Teacher 2 and Teacher 5 were using small groups to solve problems.

The teachers who participated in this study were willing to continue working with each other through a Learning Community. Teacher 5 enjoyed her time so much that she went back to her building and tried to share what she had observed in another classroom (May 1, 2007). They have suggested that with the work of teachers, administrators, and the district, this would be something that could take place. How it was approached and handled by all three levels would result in the success or failure of the Learning Community. They believe that if it were organized at the beginning of the year with people who would want to participate in it, then the Learning Community would be beneficial to them.

Conclusions

Teachers who are willing to interact with other teachers become challenged to think in-depth about how they teach math to students. A Professional Learning Community can be a district's way of providing time and staff development to teachers who are willing to participate. This research does not address the difficulty of getting reluctant teachers to interact with other teachers, apply others' ideas, become more in-depth thinkers, or be willing to participate in a Professional Learning Community.

Teachers who were involved with this study volunteered. These teachers represent 15% of the district. They already had a desire to work with others. They have also expressed a concern about forcing reluctant teachers into a Professional Learning Community. They felt that forcing people to be there would defeat the purpose of teacher interaction to share ideas and suggestions for reflective thinking.

This study is different from most of the articles read for this research. Instead, this action research is trying to provide teachers with the time to interact with each other to discuss teaching math without a Professional Learning Community present in the district. This research provides

districts a starting point for investigating if a Professional Learning Community would be helpful to its teachers. Due to the commitment needed for either Lesson Studies or Professional Learning Communities, districts need to investigate their ability to be dedicated to a program for an extended amount of time. They need to be willing to invest in continuous staff development for a Professional Learning Community, and realize there is not a quick fix to improved instruction.

Implications

Investing in teachers who are willing to improve upon classroom instruction will only benefit the students and teachers with whom they are in contact. Although there were few teachers who were willing to participate in the beginning, perhaps more teachers would have expressed an interest if the research had continued longer. This researcher would like to believe that when others begin to understand the change that took place in the classroom and the teacher, they too would want to become a part of the process. The district must provide support to their teachers by providing ongoing staff development and time to work as a Professional Learning Community.

To further this study, the researcher would begin at the beginning of the next school year recruiting teachers who would like to share ideas about teaching mathematics. A scheduled meeting would be placed on all calendars monthly. Teachers would be encouraged to bring two concerns they have about teaching math or classroom procedures. Once at the meeting, teachers would have two minutes to express anything they wish with the person sitting next to them. After that the meeting would begin. It could continue a discussion from the month before, or teachers could list concerns and pick one to investigate a further. Staff development for a Professional Learning Community would take place during a staff development day. The administration would have to support the teachers who elected to be in this group by allowing them to attend the

staff development and the monthly meetings, which could be during staff development time. They would not be allowed to decide who became a part of the Professional Learning Community. This is not a quick fix for a reluctant teacher. Teachers also need to understand that the Professional Learning Community will only be successful over time. They must be willing to allow their teachers to be a part of this Professional Learning Community for years.

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Appendix A

Teacher Initial Interview Questions

1. To what extent do you seek out other teachers' thoughts and ideas on how to teach math?

2. To what extent do you seek out your principal's thoughts and ideas on how to teach math?

3. When do you get an opportunity to work with your same grade level teacher about teaching math?

4. When do you get an opportunity to work with other grade level teachers about teaching math?

5. To what extent do you take others' ideas back to your classroom and apply them?

6. How much time do you spend preparing to teach a typical math lesson?

7. How do you determine the success of the math lesson for students?

8. What professional development have you been involved in this year dealing with mathematics?

Journal weekly questions to guide me:

1. Are teachers beginning to collaborate more with others in their building or others not in their buildings?

2. How did I encourage teachers to become more reflective on how they are teaching mathematics?

3. How did time play a factor in the success or failure of the week?

Appendix B

Date

Time For π!

Math TOSA/ 308-324-4681 ext.33

Sharing a Slice with:

- 3, 4, 5, 6, 7, 8, 9-12
- Bryan
- Morton
- Pershing
- Sandoz
- LMS
- LHS

Dates of Importance:

Quarterly Tests

Nov. 3, 2006 QT1 Due
Jan. 12, 2007 QT2 Due
Apr. 5, 2007 QT3 Due
May 18, 2007 QT4 Due

K-2 Surveys

Sept 22, 2006 Form A
Jan 26, 2007 Form B
Apr 27, 2007 Form C

Purpose of the visit:

_____ Model a Lesson

_____Co-Teach a Lesson

_____Classroom Observation with Feedback

_____Problem Solving

_____Professional Development

_____Other

Notes:

_____

_____

_____

_____

_____

Feedback and Questions:

_____

_____

_____

_____

_____

_____

Appendix C

Teacher Exit Interview Questions

After this experience:

1. To what extent do you seek out other teachers' thoughts and ideas on how to teach math?

2. To what extent do you seek out your principal's thoughts and ideas on how to teach math?

5. To what extent do you take others' ideas back to your classroom and apply them?

6. How much time do you spend preparing to teach a typical math lesson?

7. How do you determine the success of the math lesson for students?

8. What professional development have you been involved in this year dealing with mathematics?

9. Would you be willing to participate in a learning community built of other teachers in the district who sit down and focus on teaching issues related to math?

10. When would you suggest teachers get an opportunity to work with other teachers both in the same grade and in different grades or in different buildings about teaching math?

11. How do you suggest that opportunity be accomplished?

Appendix D

1. How do teachers perceive other teachers? (1-5)

1. To what extent do you seek out other teachers' thoughts and ideas on how to teach math?

	Stay the same	Increase	Decrease	
Teacher 1	x			Once a week was average for this group.
Teacher 2		x		
Teacher 3		x		
Teacher 4	x			
Teacher 5	x			
Teacher 6	x			

2. To what extent do you seek out your principal's thoughts and ideas on how to teach math?

	Stay the same	Increase	Decrease		
Teacher 1	x			Never	
Teacher 2	x				
Teacher 3	x				
Teacher 4	x				
Teacher 5	x				
Teacher 6	x				

3. When do you get an opportunity to work with your same grade level teacher about teaching math?

	Stay the same	Increase	Decrease		
Teacher 1	x			Daily, weekly, monthly, not really a set time only on a needs basis.	
Teacher 2	x				
Teacher 3	x				
Teacher 4	x				
Teacher 5	x				
Teacher 6	x				

4. When do you get an opportunity to work with other grade level teachers about teaching math?

	Stay the same	Increase	Decrease		
Teacher 1		x		Rarely, never	
Teacher 2		x			
Teacher 3		x			
Teacher 4		x			
Teacher 5		x			
Teacher 6		x			

5. To what extent do you take others' ideas back to your classroom and apply them?

	Stay the same	Increase	Decrease	
Teacher 1		x		Weekly, all the time, whenever possible, any time, 80% of the time

Teacher 2		x			
Teacher 3		x			
Teacher 4		x			
Teacher 5		x			
Teacher 6	x				

Observations made by researcher

Teacher 1	Applied training from summer workshop to classroom.
Teacher 2	Doing activity that was team based with Language Arts, Math, Science, Social Studies
Teacher 3	Lesson was formulated by using another teacher of the same grade level.
Teacher 4	Uses terms with students suggested by resource teacher when team-taught class.
Teacher 5	Followed suggestion for student work time in class regarding grouping and management.
Teacher 6	Asked observer a question on how to solve a problem while working with the students.

Observations made by observing teacher

Teacher 1	Used a timer to stay on teaching task.
Teacher 2	Used small groups then student led work going through each problem.
Teacher 3	
Teacher 4	Thanks for the front door and back door when working on multiplying and dividing fractions.
Teacher 5	Small groups working numbers 1-10, whole group 11-15.
Teacher 6	Had students go to the board and work the problem.

Journal Entry

4-5-07 I was excited to see one teacher had taken a suggestion and applied it to the classroom! The teacher was much happier and the students were more responsible for their learning.

4-19-07 Teachers can get out of their buildings (never done) to see how the other side teaches.

4-26-07 Teachers came back with observation sheets filed out and smiles on their faces. I really think they enjoyed their time.

2. How do you challenge teachers to become more in depth thinkers about how they teach math to students? 6-8

6. How much time do you spend preparing to teach a typical math lesson?

	Stay the same	Increase	Decrease	
Teacher 1			x	10-15 minutes, 30 minutes, 2 hours
Teacher 2		x		
Teacher 3	x			

Teacher 4	x			
Teacher 5		x		
Teacher 6	x			

7. How do you determine the success of the math lesson for students?

	Formal Assessment	Informal Assessment		
Teacher 1	x	x		Formal: Testing, weekly, quarterly Informal: Student reaction, interacting with groups, walking around, pulling sticks listening
Teacher 2	x	x		
Teacher 3	x	x		
Teacher 4	x	x		
Teacher 5	x	x		
Teacher 6	x	x		

8. What professional development have you been involved in this year dealing with mathematics?

	District	State	National	
Teacher 1	x			Summer math training for teachers, NATM State Conference, NATM board member
Teacher 2				
Teacher 3	x	x		
Teacher 4	x	x		
Teacher 5				
Teacher 6				

Observations made by researcher

Teacher 1	When planning your lessons and thinking about assessing the level of student engagement, what things do you consider when choosing activities that will maximize time on task and therefore enhance student understanding?
Teacher 2	When you are presenting your math lesson and thinking about delivering content what criteria do you consider in deciding how you will present the information to best enhance student learning?
Teacher 3	When planning your math lessons and thinking about state standards, what factors do you consider when deciding how many lessons will be taught that will ensure students will have an opportunity to learn all grade level material?
Teacher 4	When you are presenting your lesson and thinking about delivering content, what criteria do you consider in deciding how you will present the information to best enhance student learning?
Teacher 5	When planning your math lessons and thinking about state standards, what factors do you consider when deciding how many lessons will be taught that will ensure students will have an opportunity to learn all grade level material?
Teacher 6	When you are planning your lesson and thinking about questioning strategies, what criteria do you consider to decide what cognitive level of questions to ask to maximize student learning

Observations made by observing teacher	
Teacher 1	When ordering fractions, have you tried LCD? How often do you work with and without calculators?
Teacher 2	Is this an honors class?
Teacher 3	
Teacher 4	Thanks for reminding me about the magic number when doing LCM. How do you decide your groups?
Teacher 5	Is it better to have mixed groups or leveled? Liked the connection to real life examples: kl=bath tub
Teacher 6	Asked students for method to solve in different way.

Journal Entry

3-8-07, Most interviews opened themselves to other chances to question me about mathematics or a lesson they had taught.

4-12-07, I observed, and then asked questions or gave suggestions on how to present something they were working on. Each teacher had a reflective question dealing with math questioning skills or grouping of students. Most of the teachers found the observations interesting. Statements like, "I didn't know that," or "Yeah I am bad about that." were shared. They were somewhat hesitant to sit down and go over the observation, but afterward, they were happy and thankful.

3. How do you encourage (prepare) teachers to become a part of a learning community? 9, 3, 4

9. Would you be willing to participate in a learning community built of other teachers in the district who sit down and focus on teaching issues related to math?

	Yes	No	Maybe	
Teacher 1	x			If there was: time, a common goal, people there who wanted to be there not forced to do it.
Teacher 2	x			
Teacher 3	x			
Teacher 4	x			
Teacher 5	x			
Teacher 6			x	

3. When would you suggest teachers get an opportunity to work with other teachers both in the same grade and in different grades or in different buildings about teaching math?

	Before/After School	Staff Development	Summer time	
Teacher 1		x		Problems: Help kids after school, coaching, summer is personal time, when do we get our personal items done
Teacher 2	x	x	x	
Teacher 3		x		
Teacher 4		x	x	
Teacher 5	x			
Teacher 6		x		

4. How do you suggest that opportunity be accomplished?

	Teacher/Building	Administration	District	
Teacher 1	x	x		Teachers can ask, administration must support it. Needs to be on a want to not a have to. Can't make that decision on our own.
Teacher 2		x		
Teacher 3		x		
Teacher 4		x		
Teacher 5		x		
Teacher 6	x		x	

Observations made by researcher

Teacher 1	Applied training from summer workshop to classroom. Teacher is willing to work with others.
Teacher 2	Doing activity that was team based with Language Arts, Math, Science, and Social Studies. Willing to work with others
Teacher 3	Lesson was formulated by using another teacher of the same grade level. Willing to work with others.
Teacher 4	Uses terms with students suggested by resource teacher when team-taught class. Applied another's ideas for teaching math.
Teacher 5	Followed suggestion for student work time in class regarding grouping and management. Applied another's ideas for teaching strategies.
Teacher 6	Asked observer a question on how to solve a problem while working with the students. Willing to ask for help.

Observations made by observing teacher

Teacher 1	Used a timer to stay on teaching task. Teacher is willing to take ideas back to classroom.
Teacher 2	Used small groups then student led work going through each problem. Suggested by Resource teacher.
Teacher 3	
Teacher 4	Thanks for the front door and back door when working on multiplying and dividing fractions. Suggested by Resource teacher.
Teacher 5	Small groups working numbers 1-10, whole group 11-15. Teacher is willing to take ideas back to the classroom.
Teacher 6	Had students go to the board and work the problem. Suggested from early observation.

Journal Entry

4-26-07 Teachers came back with observation sheets filed out and smiles on their faces. I really think they enjoyed their time.

5-3-07 None of the teachers I talked with have ever gone to their building principals for guidance on how to teach math. Yet they want administration to set up and run a professional learning community dealing with issues on teaching math.