

FAME: FAMILIES ACHIEVING MATHEMATICAL EXCELLENCE  
THE PROCESS OF DEVELOPING A FAMILY INVOLVEMENT PROGRAM FOR A  
WESTERN RURAL MIDDLE SCHOOL SERVING  
AMERICAN INDIAN STUDENTS

by

Susan Marie Bollinger

A dissertation submitted in partial fulfillment  
of the requirements for the degree

of

Doctor of Education

in

Curriculum and Instruction

MONTANA STATE UNIVERSITY  
Bozeman, Montana

April 2010

©COPYRIGHT

by

Susan Marie Bollinger

2010

All Rights Reserved

APPROVAL

of a dissertation submitted by

Susan Marie Bollinger

This dissertation has been read by each member of the dissertation committee and has been found to be satisfactory regarding content, English usage, format, citation, bibliographic style, and consistency, and is ready for submission to the Division of Graduate Education.

Dr. Elisabeth Swanson

Dr. Jennifer Luebeck

Approved for the Department of Education

Dr. Joanne Erickson

Approved for the Division of Graduate Education

Dr. Carl A. Fox

## STATEMENT OF PERMISSION TO USE

In presenting this dissertation in partial fulfillment of the requirements for a doctoral degree at Montana State University, I agree that the Library shall make it available to borrowers under rules of the Library. I further agree that copying of this dissertation is allowable only for scholarly purposes, consistent with "fair use" as prescribed in the U.S. Copyright Law. Requests for extensive copying or reproduction of this dissertation should be referred to ProQuest Information and Learning, 300 North Zeeb Road, Ann Arbor, Michigan 48106, to whom I have granted "the exclusive right to reproduce and distribute my dissertation in and from microform along with the non-exclusive right to reproduce and distribute my abstract in any format in whole or in part."

Susan Marie Bollinger

April 2010

## ACKNOWLEDGEMENTS

First and foremost I wish to thank the Hardin Public School District for giving me the opportunity to implement the FAME program and their support of my continued education and completion of this dissertation.

Thanks to Dr. Elisabeth Swanson for offering me the opportunity to embark on this adventure and to Dr. Jennifer Luebeck for her unending support in the completion of this project. Thanks to Dr. Maurice Burke and Dr. Jayne Downey for supporting my efforts by agreeing to be on my committee.

I wish to thank my dad and mom, Jim and Jean Boos, and my sisters, Barb Stuhlsatz, Vicki Boos, and Linda Alexander for their encouragement and happy thoughts. I would also like to thank my sons, Ryan and Zachary Wood, for their understanding and patience while I was pursuing my degree even though the time I spent was part theirs. Finally, I wish to thank my husband Rodney for never giving up on me. His support and encouragement helped me through many frustrations, fears, and doubts.

This material is based upon work supported by the National Science Foundation under The Center for Learning and Teaching in the West, Grant No. 0119786

## TABLE OF CONTENTS

1. INTRODUCTION.....	1
Background for the Study .....	1
Statement of the Problem .....	2
Purpose of the Study .....	3
Research Questions.....	4
The Limitations.....	4
The Definitions of Terms and Concepts.....	5
Significance of the Study.....	5
2. REVIEW OF LITERATURE.....	6
The History, Current Status and Recommendations for American Indian Education.....	6
History of American Indian Education.....	6
Current Status of American Indian Student Achievement in Mathematics and Other Studies.....	8
Recommendations for American Indian Student Achievement.....	9
Rural Populations.....	11
Students of Poverty.....	13
Family Involvement in Poverty Situations.....	15
Family Involvement.....	17
Definitions of Family Involvement.....	18
Benefits of Family Involvement.....	20
Why Parents Get Involved.....	22
Parent Perception of Their Role in Children’s Education.....	23
Parents’ Sense of Efficacy.....	24
Parents’ Perception of Invitations and Opportunities for School Involvement.....	24
Family Status Variables.....	26
How Parents Get Involved.....	27
Parenting.....	27
Home-School Relationships.....	28
Responsibility for Learning.....	30
Interactive Homework and Family Support Network.....	30
Homework.....	30
Why Teachers Assign Homework.....	31
Homework Management.....	32
Interactive Homework.....	33
Curricula and Research Tools.....	35
Family Interventions.....	35
Family Mathematics Programs.....	35
Family Math.....	35

## TABLE OF CONTENTS – CONTINUED

MAPPS Mini-courses and Parent Workshops.....	36
Research Tools.....	36
Parent Survey.....	36
Student Survey.....	39
Barriers.....	41
<b>3. METHODOLOGY.....</b>	<b>45</b>
Context of Study.....	45
Communities.....	45
The Middle School.....	46
The Mathematics Curriculum.....	47
Research Design and Methods.....	48
Research Purpose and Specific Research Questions.....	48
Research Design.....	49
Methods of Data Collection.....	50
Family Involvement Surveys.....	52
Sampling Method.....	52
FAME Math Evaluations.....	53
Sampling Method.....	55
Teachers Involving Parents in Schoolwork (TIPS).....	56
Sampling Method.....	57
Research Journal Data.....	57
Interviews.....	57
Sampling Method.....	59
Methods of Descriptive Data Analysis.....	60
Parent/Student Survey Analysis.....	60
TIPS Homework Analysis.....	60
Methods of Narrative Data Analysis.....	61
Looking for Themes Within a Data Source.....	61
Looking for Themes Across Data Sources.....	62
Triangulation of Data.....	63
Measures to Ensure Strength and Credibility of Data.....	64
Family Math Intervention Implemented in the Study.....	66
Family Math Nights.....	66
Math Mini-Courses.....	68
Math Workshops.....	70
Teachers Involving Parents in Schoolwork (TIPS).....	71
Researcher Background and Roles in the Study.....	74
Summary.....	74
<b>4. RESULTS.....</b>	<b>76</b>

## TABLE OF CONTENTS – CONTINUED

Parent Survey Results.....	76
“Your Family” - Demographic Information.....	77
“The School’s Contact with You”.....	77
School Climate.....	79
“Your Involvement” - Parent Involvement.....	80
“Your Ideas” - Perceived Parental Roles.....	82
Student Survey Results.....	85
“About You and Your Family”.....	85
“Your Ideas”.....	85
“You and Your Family”.....	88
Parent Involvement.....	89
“Your School and Family”.....	92
FAME Math Event Overview.....	94
FAME Math Night Evaluation Data.....	94
Research Journal Data.....	97
Documenting Implementation.....	98
Documenting Successes.....	99
TIPS Homework Assignment Data.....	100
Positive Comments.....	100
Negative Comments.....	102
Summary.....	103
Interview Data.....	104
First Impressions.....	104
Mathematics Content.....	106
Family Involvement.....	107
Interview Themes.....	107
Welcome.....	109
Structure.....	110
Incentives.....	110
Accessibility.....	111
Interview Summary.....	112
Synthesis of the Data.....	112
Summary.....	113
<b>5. CONCLUSIONS.....</b>	<b>115</b>
Review and Purpose of the Research Study.....	115
Research Questions and Findings of the Study.....	117
Prior to Involvement in FAME, How do Students and Families Perceive the Families’ Role in Mathematics Education?.....	117
Limitations of Surveys.....	118



## TABLE OF CONTENTS – CONTINUED

How Does the Process of Implementing the FAME Program Evolve Over Time?.....	118
How Do Families Respond to and Participate in the FAME Program?.....	122
Participation Rates for TIPS vs. Other Interventions.....	123
Findings Related to Previous Research.....	124
Implications for Providers of Family Involvement Programs in American Indian Communities.....	125
Creativity for High Response Rates.....	126
Methods of Welcome.....	126
Selection of Mathematics Content and Family Mathematics Programs.....	127
Availability of Materials.....	127
The Importance of Food.....	128
Logistics.....	128
Limitations of Program Types.....	128
Summary of Implications.....	129
Recommendations to District Administrators and School Boards Regarding Support for Family Involvement Programs in Mathematics in American Indian Communities.....	129
Materials for All.....	130
Administration and School Boards Getting Involved.....	130
Support and Encouragement.....	131
Getting the Word Out.....	131
Incentive, Incentive, Incentive.....	131
Long-term Commitment.....	132
Other Ways to Support Family Involvement Programs.....	132
Suggestions for Further Research.....	133
Sense of Welcome.....	133
Family Mathematics Programs.....	133
Flexible Structure.....	134
Why Parents Get Involved.....	135
Home Support.....	135
Conclusions.....	136
REFERENCES CITED.....	138
APPENDICES.....	149
APPENDIX A: Parent Survey of Family and Community Involvement in the Elementary and Middle Grades.....	149
APPENDIX B: Parent Survey Scales and Reliability Coefficients.....	158

## TABLE OF CONTENTS – CONTINUED

APPENDIX C: FAME Parent Survey Scales and Reliability	
Coefficients.....	162
APPENDIX D: Student Questionnaire.....	164
APPENDIX E: Student Survey Scales and Reliability Coefficients.....	170
APPENDIX F: FAME Student Survey Scales and Reliability	
Coefficients.....	173
APPENDIX G: Family Interview Protocol.....	175
APPENDIX H: Sample TIPS Homework Assignment.....	178

## LIST OF TABLES

Table	Page
1. Responses to the “School’s Contact with You” Questions .....	78
2. Comparison of American Indian and Caucasian Responses to the “School’s Contact with You” Questions.....	79
3. Responses to “Your Involvement” - Parent Involvement Questions .....	80
4. Comparison of American Indian and Caucasian Responses to “Your Involvement”- Parent Involvement Questions.....	81
5. Responses to “Your Ideas” - Perceived Parental Role Questions .....	83
6. Comparison of American Indian and Caucasian Responses to “Your Ideas” – Perceived Parental Role Questions.....	84
7. Responses to “Your Ideas” Questions .....	86
8. Comparison of American Indian and Caucasian Responses to “Your Ideas” Questions.....	87
9. Responses to Parent Involvement Questions .....	89
10. Comparison of American Indian and Caucasian Responses to Parent Involvement Questions.....	90
11. Responses to “Your School and Family” Questions .....	92
12. Comparison of American Indian and Caucasian Responses to “Your School and Family” Questions.....	93
13. FAME Attendance .....	95
14. TIPS Homework Assignments .....	100

LIST OF FIGURES

Figure	Page
1. Research Design Table .....	51
2. FAME Math Evaluation .....	54
3. Geometry Family Math Night Take-Home Packet .....	67
4. Geometry Course Agenda .....	69
5. Wrap It Up Agenda .....	72

## ABSTRACT

Family is an important element in the cultural identity of this American Indian community so involving families in the education of their children is crucial. This mixed methods study documents the process of implementing a family involvement program at a rural school serving predominantly low-income families near an American Indian reservation. The results showed there is a strong sense of responsibility among the parents for the education of their children. Parents and students were found to work together to improve their learning by reviewing homework together and doing learning activities at home. Interview data stressed the importance of developing a welcoming learning environment at school and at afterschool events that is culturally sensitive. Families need to feel they are welcomed and respected. The structure of afterschool events must be flexible and familiar for continued participation. Facilitators of family involvement programs in American Indian communities need to design programs that are culturally responsive to the local tribe and community, supporting the comfort and learning of the participants, providing materials for everyone to take home, and bringing the program to the people.

## CHAPTER 1

## INTRODUCTION

Discussion of the importance of family involvement in education is spread throughout the policy arena and spans thirty years of educational research. This research supports family involvement in the middle and high school years, not just elementary years, as an important tool for school success and a provider of other positive results for youth (Kreider, Caspe, Kennedy, & Weiss, 2007). When families participate in specific programs aimed at increasing involvement, improvements are seen in overall achievement (Anderson & Minke, 2007).

Background for the Study

According to the Final Report of the National Mathematics Advisory Panel (2008), success in mathematics education is not only important for scientists and engineers, but important for individual citizens because it gives them college and career opportunities. A strong grounding in high school mathematics increases the prospects for future income. Moreover, there are large disparities in mathematics achievement related to race and income. These disparities are devastating to individuals and families, as well as to the nation as a whole.

A widely held belief in education is that parents are vital for the academic success of their children. Research seems to suggest that parent involvement is positively correlated with academic success for most students, and the more parents are involved in

a child's education, both at home and at school, the more academically successful the child will be (Ingram, Wolfe, & Lieberman, 2007). Research suggests that there is not a problem with lack of desire by parents or schools for parent involvement; the problem is that most schools are unsure how to involve parents in a way that translates into student achievement (Ingram, Wolfe, & Lieberman, 2007). Family involvement is a powerful influence on children's achievement. When families are involved in their children's education, children earn higher grades and receive higher test scores, attend school more regularly, complete more homework, and demonstrate positive attitudes and behaviors (Funkhouser & Gonzales, 1997). Throughout the literature, parent and family involvement is defined in a variety of ways. Shaver and Walls (1998) define parent involvement as the rate at which parents attend specific activities at school. Others use broader definitions that include home-based activities (Grolinick, Benjet, Kurowski, & Apostoleris, 1997). The Indian Nations at Risk Task Force (U.S. Department of Education, 1991) separated parental support (parent-teacher conferences, ensuring homework is completed, and making sure their children get to school) from parental involvement (serving on committees and participating in parent-teacher organizations). Family involvement, in this study, is the active participation in a child's education between a supportive adult and a child at home and at school, including regular communications between the child, a supportive adult, and the school.

### Statement of the Problem

The 1991 Indian Nations at Risk Task Force of the United States Department of Education described the educational status of American Indians as at risk (Rampey, B.D.,

Lutkus, A.D., and Weiner, A.W., 2006). Improving the quality of education for American Indian students presents a complex challenge for schools serving American Indian communities. Especially important players in meeting this challenge are American Indian educators, researchers, parents, and tribal and political leaders (Demmert, 2001).

American Indian communities are challenged with working on the retention of their distinct cultural identities while preparing their members for the rapidly changing world of technology and diverse cultures (Demmert, 2001).

A comprehensive report of education in rural communities (Stern, 1994) found high rates of poverty and low educational attainment. Rural schools are staffed by less experienced teachers and administrators with lower salaries and less benefits than teachers in urban areas (Herzog & Pittman, 1995). There are realities confronting policymakers concerned about shaping the educational policies to respond to the needs of rural students and the schools they attend, particularly where the socio-economic circumstances present special educational challenges (Johnson & Strange, 2009). The 2009 Why Rural Matters report describes Montana as having three of four schools in rural areas. Their school population has a moderately high percentage of rural minority students and a very high rate of mobility. Instructional spending is above average, but the revenue distribution is inequitable and teacher salaries are low (Johnson & Strange, 2009).

### Purpose of the Study

The purpose of this study is to document the process of implementing the Families Achieving Mathematical Excellence (FAME) program, a family involvement



program at a rural school located near an American Indian reservation, and serving a large proportion of American Indian families and families with low income. The goal is to obtain a comprehensive understanding of the process of implementing a program designed with this particular setting in mind. This comprehensive understanding includes the effectiveness of different program components and how these effective components link to this unique context.

### Research Questions

The principal research questions of this study are:

1. Prior to involvement in FAME, how do students and families perceive the families' role in mathematics education?
2. How does the process of implementing the FAME program evolve over time?
  - a. What barriers and unexpected issues arise?
  - b. What adaptations become necessary and why?
  - c. What features of the program are most effective?
3. How do families respond to and participate in the FAME program?

### The Limitations

The findings are based on parent and student perceptions of family involvement in mathematics learning, as well as this author's observations as the FAME leader and researcher. The focus of the study is limited to one middle school. Other researchers less invested in the outcomes were included only during the coding and interpretation of the qualitative data. Additionally, study is limited by the time frame. Furthermore, potential change in the level of student achievement will not be addressed in this study.

### Definitions of Terms and Concepts

**Family involvement**—active participation in a child’s education by one or more supportive adults both at home and at school, including regular communications between the child, the supportive adult(s), and the school.

**Support**—assistance provided to families of students learning mathematics through content-based family events (e.g., math nights, math workshops, and math mini-courses) and through ongoing communications between the home and school.

### Significance of the Study

Describing the process of implementing the FAME program at a single rural middle school serving over 70 percent American Indian students can elicit a better understanding of potential pathways for American Indian parent involvement. Rural, low-income, and American Indian students are often at the low end of the achievement continuum. Schools must work on reducing the achievement gap among all students. Parent and family involvement is shown to be a significant factor in student success. Therefore, it is significant to study parent and family involvement as a vehicle for narrowing the achievement gap among rural, low-income, and Native American students. In order to successfully study parent and family involvement, we need to know what works, what does not work, what must be overcome, and how to maximize the potential for parent and family involvement to occur.

## CHAPTER 2

### REVIEW OF LITERATURE

This chapter describes the literature related to the purpose of this study. The first part of the chapter will provide a brief history of American Indian education, as this directly influences parents' attitudes toward involvement in schooling today. This section also presents current data from Montana and the nation regarding American Indian students' academic achievement in mathematics and other subject areas, especially at the middle school level, and recommendations from the research and policy literature on instructional approaches that support American Indian students' learning. The second part describes the literature related to family involvement in elementary and middle schools. The third part of the chapter will discuss literature related to interactive homework and ways to support families with mathematics topics related to the homework. The fourth section of this chapter will discuss barriers to implementing an effective family involvement program.

#### The History, Current Status and Recommendations for American Indian Education

##### History of American Indian Education

The history of American Indian education influences the understanding of American Indian parent involvement. Reasons for low parent involvement has been linked to parents' negative historical and personal experiences related to past and present American Indian education policies.

The federal government used education policy to estrange American Indian children from their parents, people, culture, language, and values in an effort to force assimilation (Butterfield & Pepper, 1991). Adams (1995) provided a historical overview of American Indian education. Congress passed laws requiring boarding school attendance and to punish American Indian parents who refused to send their children to boarding schools. Entire generations lost access to the traditional models of parenting, culture, language and values as a result of boarding schools (Pewewardy, 2002).

Reform efforts for the improvement of American Indian education have been prompted by numerous reports and policies in the twentieth century. The Indian Citizenship Act of 1924 conferred U.S. citizenship on American Indians. The Merriam Report of 1928 documented the horrendous boarding school conditions and recommended no elementary school child should be sent to one. In 1934, the Johnson-O'Malley Act allowed the federal government to pay states to educate American Indian students in public schools. The amended act provides for financial assistance for programs to meet the unique needs of American Indian students.

The 1969 "Kennedy Report" declared the education of American Indians a national tragedy (Mackety & Linder-VanBerschot, 2008). This report prompted the Indian Education Act of 1972, which recognized that parent-school partnerships are critical to improving American Indian academic achievement. This act required parental-committee or tribal sign-off for federal programs serving American Indian communities.

Since 1972, other legislation has been enacted in the effort to improve the quality of American Indian education, yet the quality of education has only moderately improved. The Indian Nations at Risk Task Force (1991) reported the conditions of

American Indian education as typified by unfriendly school climates, Eurocentric curriculum, low expectations, tracking American Indian students in low-ability groups, poor academic achievement, lack of American Indian educators, lack of parent and community involvement, racism, and high drop-out rates (Mackety & Linder-VanBerschot, 2008).

#### Current Status of American Indian Student Achievement in Mathematics and Other Studies

The No Child Left Behind Act of 2001 (NCLB) requires states to close achievement gaps between all student sub-groups and encourages parental involvement in a variety of ways. As a follow-up to NCLB, President Bush signed Executive Order 13336 – American Indian and Alaska Native Education - on April 30, 2004. The purpose of this order was to assist American Indian/Alaska Native students in meeting the challenging student academic standards of NCLB. This Executive Order was meant to build on No Child Left Behind in the areas of stronger accountability for results; greater flexibility in the use of Federal funds; more choices for parents; and an emphasis on research-based instruction that works. A multi-year study was to be conducted with the purpose of compiling data on achievement and progress of American Indian/Alaska Native students; identify and disseminate research-based practices proven to increase academic achievement; assess the impact of language and culture on the development of educational strategies; and develop methods to strengthen early childhood education and increase high school graduation rates for American Indian/Alaska Native students (Executive Order No. 13336, 2004).

The success stories from the reform of American Indian education are still rare. Graduation rates have improved in the past twenty years, but the skill gaps between American Indian and Caucasian students are still wide. The 2006 National Indian Education Study, Part I, reports American Indian/Alaska Native students at both grades 4 and 8 had lower average scores in mathematics and reading than the average score for all other students in the nation. The percentages of students performing at or above Basic and at or above Proficient were lower for American Indian/Alaska Native students than for all other students at both grades (Rampey, Lutkus & Weiner, 2006).

#### Recommendations to Improve American Indian Student Achievement

Much more difficult than measuring low achievement is figuring out what the reason for such lack of progress is. In 1999, the state of Montana passed House Bill 528 into law – MCA-201-501 – which has become known as Indian Education for All.

Briefly, the bill states,

Every Montanan ... whether Indian or non-Indian, be encouraged to learn about the distinct and unique heritage of American Indians in a culturally responsive manner. ...all school personnel should have an understanding and awareness of Indian tribes to help them relate effectively with Indian students and parents. ... Every educational agency and all educational personnel will work cooperatively with Montana tribes ... when providing instruction and implementing an educational goal (Montana Office of Public Instruction, 2009).

A growing body of research reports on the positive aspects of including the language and cultural base of the American Indian community served as a necessary characteristic of successful schools (Demmert, 2001). Demmert and Towner (2003) developed hypotheses derived from their synthesis of literature on Native language

research and found research to support the hypotheses. They hypothesized that Native children who are taught in their Native language will perform at or above the children who are taught in the dominant second language; children who are proficient in their Native language will be proficient in the dominant second language; and programs that include the children's Native language strengthen home-school relations.

In order to improve literacy, science and mathematics skills, the research indicates that students need to spend more quality time learning the subject matter and connecting science and mathematics to local and traditional knowledge (Demmert, 2001). Research findings in mathematics education for American Indian students show that curricula and practices that acknowledge and build on traditional everyday mathematics are associated with improved academic success (Apthorp, D'Amato & Richardson, 2003).

The research on effective teachers and teaching within the American Indian community is somewhat limited, but consistent with the research on non-Native teachers. Teacher attitudes about students, knowledge of subject matter, and understanding and knowledge about the culture of students are all shown to promote improved academic performance and student behavior (Demmert, 2001). Successful classroom teachers are able to organize their classes and adjust their teaching strategies in a way that motivates, engages, and challenges students to learn. A factor that influences these organizational skills and teaching strategies is the cultural context in which learning takes place.

Culturally responsive education and teacher-community-school relationships were created by Eskimo teachers and documented by Lipka, Mohatt, and The Ciulistet Group in 1998. Lipka and Adams (2004) conducted a study with positive findings in the area of culturally based education with a mathematics focus. In this study of Alaska

Native students, a culture-based mathematics module was taught to sixth grade students and was found to improve performance differences for Alaska Native students.

McCarty (2002) reported the results of 20-year ethnography of Navajo self-determination at the first school to be controlled by an American Indian community. McCarty documented the transformation of the school's curriculum and pedagogy to reflect local cultural norms. One of the greatest achievements at the Rough Rock School was to find ways to incorporate the Navajo language and culture into the everyday curriculum at the school (McCarty, 2002).

Studies on effective schools confirm the importance of parental participation (Demmert, 2001). In a study of Navajo students, motivation to do well in school was strongly linked to parents and extended family members. At one Montana college, students from Native families with traditional cultural values were more achievement oriented, had higher grade point averages and spent more time doing homework than those from more modern families (Demmert, 2001).

### Rural Populations

Isolation of life on the reservations sets these schools in a unique rural setting. The isolation is racial as well as geographic. "Racial isolation is caused by a long history of misunderstandings and distrust between the majority culture and Native Americans... Native Americans have strong connections with the land and their community... Their connection with the land and the community along with high poverty rates make it difficult for students to leave the reservation and engage in outside experiences" (Nelson, 2006, p. 30).



Schools in rural settings are usually small and are located in isolated communities. At times, small schools are consolidated and may create a much larger school. Isolated communities may be within a few miles from a larger city, but isolated by district boundaries, not geographic distance. The size of the school usually determines the types of classes available to students and the number of support staff on hand. Often administrators act as teachers and have little background or time to function as instructional leaders in mathematics or other curricular areas.

Nearly one in three of America's school-age children attend public schools in rural areas with 30% of these schools designated as small rural schools. According to the National Center for Educational Statistics, rural schools are defined as a school or district that is situated in a community with less than 2,500 residents (Johnson & Strange, 2009). Nationally, about 19 percent of school-aged children attend rural schools.

The Why Rural Matters 2009 report states that in Montana three of four schools are rural. The student population has a moderately high percentage of rural minority students, 22 percent, and a very high rate of mobility, 14 percent. Rate of mobility is defined as "the percentage of rural households with school-age children that have changed residences within the previous 12-month period" (Strange & Johnson, 2009). The educational policy context consists of instructional spending above average and schools and districts are small, but the revenue distribution is inequitable and teacher salaries are low. Educational outcomes, which describe student academic achievement on state and national assessments and schools' high school graduation rate, are above average but rural performance on national mathematics assessments is very low (Strange & Johnson, 2009).

The percent of student poverty and percent of minority students in concentrated poverty districts are among the highest in the U.S. Rural student poverty in the United States averages about 64 percent compared to Montana's average of about 81 percent. Rural minority students in Montana average about 84 percent compared to the entire nation's average of about 43 percent.

Educators in rural settings have the responsibility of providing children with a quality education that encompasses a wide expanse, such as the need to understand and appreciate the qualities and opportunities of their rural communities as well as those of the larger, global society (Haar, 2005). One advantage a rural place can have over other places is the strength of its community. In fact, the strength of community may be thought of as the backbone for many rural places and as giving these places their identity. Rural schools often enjoy strong community support and more parental involvement than non-rural schools (Keith, Keith, Quirk, Cohen-Rosenthal & Franzese, 1996).

### Students of Poverty

The number of students entering school who live in poverty is increasing from year to year, creating challenges for schools (Pellino, 2007). Children of poverty generally achieve at lower levels than children of middle and upper classes (Pellino, 2007). The causes are numerous and are related to both the social environment in which poor children live and the education they receive in school. Factors such as the quality of student learning behaviors, home environment, past experiences with education, and teacher attitudes are among the many influences on student achievement (Pellino, 2007).

In the communities where the students in this study reside, the unemployment rates are some of the highest in the nation. Throughout the years, the unemployment rates ranged for 60 percent – 85 percent in this area. Over 75 percent of on-reservation people live below the federally established poverty level (Montana Office of Public Instruction, 2009). There is evidence that students in Montana who attended smaller schools outperformed students attending larger schools (Lewis, 2001), but this does not appear to be the case for the reservation schools.

High-mobility is a symptom of poverty. Children living in poverty situations may live in short-term residences that change often. The conditions these children live in and their life experiences they deal with every day can have a significant effect on their education and achievement. Along with high-mobility, school attendance is often sporadic (Bandura, 2001).

Children from low SES live in situations in which they have little control (Pellino, 2007). They have no choice in the decision of where they live or whether their parent may be unemployed or disabled. They have no choice as to whether they will be born into poverty. They often want or need to escape this environment and want to do better, but they do not feel they have any control over the quality and structure of their lives. The concept of agency is the concept that one can intentionally make things happen by their actions (Bandura, 2001). This concept is the basis of social learning or social cognitive theory. If children are shown they can be agents, it may encourage them to take an active role in their own self-development and to take responsibility for their learning, personal development, and achievement (Bandura, 2001).

An article by Haycock (2001) calls attention to issues related to poverty and the achievement gap through research conducted by The Education Trust in the late 1990's. Both children and adults were questioned about what they feel are causes of the achievement gap. One comment made by the children was that it hurts them more that the teachers teach them less. Haycock (2001) comes to the conclusion that we take the students who start out with less, then routinely give them less in school.

Berliner's (2006) meta-analysis found numerous studies indicating that poverty is negatively related to school achievement. The mathematics achievement of students attending schools where poverty is prevalent is extremely low (Berliner, 2005). In the NCTM's monograph on the impact of poverty on the mathematics education of American students, the authors, using findings from the task force on Mathematics Teaching and Learning in Poor Communities, maintain that students in small, poor, rural communities must have the same access to appropriate instructional materials and organized curricula; be instructed by teachers hired with competitive salaries, appropriate professional development and stable working conditions as those in more affluent communities, even though the delivery method may be different (Campbell & Silver, 2000).

Family Involvement in Poverty Situations. One big challenge is developing positive relationships with parents and families who live in poverty situations and getting them involved in their children's education and active in school activities. When addressing this challenge, it is first necessary to comprehend the critical process of parenting against the background of poverty. This process affects many developmental progressions for children living in poverty. Living in poverty conditions, and the

emotional and psychological stress that goes with living in poverty conditions, weakens parent ability (Guerra & Schutz, 2007).

Stability, security, and access to basic resources are conditions required for families to be successful and are often lacking in the environment of poverty. Parents exhibit less capacity to be supportive and consistent in their parenting (Pellino, 2007). Overall, parental support and involvement in school activities is lower among poor parents. This does not mean there is a lack of interest. It reflects issues related to poverty such as time, availability and affordability of childcare and/or transportation (Kaiser and Delaney, 1996).

A priority for schools is showing parents the importance of parents and families who are strong and supportive. Home-school collaboration is important for children of poverty. It helps to better facilitate educational outcomes (Raffaele and Knoff, 1999). Relationships with these families are often the most difficult to foster. Because of this, schools need to make an extra effort to reach out to parents and families living in poverty to help them to help their children. Parents who do not have a phone, do not speak English, or cannot read can be difficult to reach.

Schools must do their best to attempt to foster a positive relationship with parents in face of resistance, trying to convince them that their involvement is for the benefit of the child, as there is no guarantee that the parents will cooperate, be receptive to the ideas, or have a positive outlook. Research has shown that only when parents trust teachers and feel accepted by teachers do the teachers stand a chance of getting through to them (McGee, 1996).

Schools can teach parents simple ways to help their children at home that are easy and time-efficient. Activities that include parents with their children can be scheduled such as family math, science, reading or technology nights. Conferences and activities at school can be scheduled at times that are convenient for parents. Childcare and activities can be provided for children while conferences are held. Meetings and activities should be held at locations that are accessible to families without transportation (Schmitz, Wagner & Menke, 2001)

Parents need to be assured that they are welcome to observe the class and spend time helping out at the school in the classroom, lunchroom or during activities. Parents should be encouraged to view student work and accomplishments. The involvement of parents sends the message to all children, not just the child of the involved parent, that school is important. Parents should be encouraged to talk to their children about school, and teachers should keep parents informed of what is going on in the classroom (Pellino, 2007).

### Family Involvement

The importance of family involvement in education is spread throughout the policy arena and spans thirty years of educational research. Legislation has been enacted at both federal and state levels of government to encourage greater parent participation in schooling, and the goal of parent involvement is included in nearly every policy aimed at improving student performance (Smrekar & Cohen-Vogel, 2001; Commissioners Parent Advisory Council (PAC), 2007). The 1991 Indian Nations at Risk Task Force agreed that parents, elders, and community leaders must become involved in their children's

education in partnership with school officials and educators (Mackety & Linder-VanBerschot, 2008).

Advocates for school-community relations believe that parent involvement mobilizes and creates resources that schools may not otherwise be able to develop which implies that the community possesses a wealth of knowledge in the form of traditions and customs that could be useful to the school community (Agbo, 2007). Secondly, the advocates believe that parents and teachers are willing to be partners in education. Research found, though, that teachers overwhelmingly said they did not want more parent-initiated contact (Agbo, 2007). Lastly, the advocates assume that parents and families are able to pool the resources that are relevant to the education of their children, which implies that parents and teachers share equal power. Research tells us that not all parents are educational resources (Agbo, 2007).

### Definitions of Family Involvement

Throughout the literature, parent and family involvement is defined in a variety of ways. Shaver and Walls (1998) define parent involvement as the rate at which parents attended specific activities at school. Delgado-Gaitan (1991) allowed the definition to be developed from the data. Others use more broad definitions that include home-based activities (Grolinick, Benjet, Kurowski, & Apostoleris, 1997; Mackety & Linder-VanBerschot, 2008). The Indian Nations at Risk Task Force (U.S. Department of Education, 1991) separated parental support (parent-teacher conferences, ensuring homework is completed, and making sure their children get to school) from parental involvement (serving on committees and participating in parent-teacher organizations).

For the first time, in the NCLB Act, the federal government offered a definition of parent involvement: Regular two-way, meaningful communications about student learning and other school activities including assisting their child's learning; being actively involved in the child's education at school; serving as full partners in their child's education; and being included in the decision making regarding the education of their child (PAC, 2007).

Parental involvement can be viewed as to include the extended family and community. There is evidence that it is not "the parent" that makes the difference, but adults who take time to talk to students, express interest in their education, and holds them accountable for learning (Ferguson, 2008). Students need a strong adult in their lives who will encourage and support learning at home from preschool through post-secondary education (2008). Romero (2004) examined how cultural influences permit the social and natural development of young Pueblo children. Using data collected from home and community observations, interviews, and field notes, he explains that the Pueblo children's socialization and learning are the responsibility of the child's caregivers which includes everyone in the community.

Hoover-Dempsey and Sandler (2005) in an empirical, longitudinal study conducted for the U.S. Department of Education, summarized four studies conducted to develop reliable and valid measures that address model constructs and to test hypotheses about causes and consequences of parental involvement in elementary children's education (Mackety & Linder-VanBershot, 2008). From these studies, Hoover-Dempsey and Sandler (2005) developed a definition that incorporates parents' motivational beliefs, perceptions of invitations, and perceived skills, time and energy for involvement.



### Benefits of Family Involvement

A great deal has been written about the power of family, school, and community partnerships. In fact, the academic encouragement parents provide to their adolescents is more powerful than support given by the adolescent's friends (Bouffard & Stephen, 2007). Research suggests that children whose families support learning tend toward positive outcomes such as higher achievement, higher attendance, and better student attitudes (Henderson & Mapp, 2002).

One of the strongest influences on children's achievement is family involvement. Children earn better grades, receive higher test scores, have better attendance, finish homework more frequently, and have more positive attitudes and behaviors when families are involved in their children's education (Funkhouser & Gonzales, 1997). How often parents attend and volunteer at school functions has a positive impact on adolescent academic achievement (Kreider et al., 2007).

When families participate in specific programs aimed at increasing involvement, improvements are seen in overall achievement (Anderson & Minke, 2007), and more parents respond by becoming more involved in those very practices (Epstein & Van Voorhis, 2001; Sanders, Epstein, & Connors-Tadros, 1999). Research seems to suggest that parent involvement is positively correlated with academic success for most students, and the more parents are involved in a child's education, both at home and at school, the more academically successful the child will be (Ingram, Wolfe, & Lieberman, 2007). Some research suggests that how parents interact with their children at home has a greater effect on academic achievement than how involved parents are at the school (Downey, 2002; Ingram et al., 2007).

Evidence shows that family involvement is associated with benefits for students, parents, teachers and schools/districts (Markward & Klein, 2006; Barrera & Warner, 2006). When adolescents perceive that their parents have high educational expectations, they have more interest in school and higher goal pursuits (Kreider et al., 2007; Bouffard & Stephen, 2007). When parents appear to value education, students are more likely to feel competent and motivated in their educational pursuits (Marchant, Paulson & Rothlesberg, 2001; Kreider et al., 2007). Teens benefit the most when teachers and parents work together to support them, without compromising the teens' need for autonomy (Dauber & Epstein, 1993; Lazar & Slostad, 1999).

Gutman and Midgley (2000) suggested poor minority students' achievement may rely on a combination of parent involvement and school factors. This descriptive study of 62 poor black families used parent and student surveys to examine the psychological, family, and school factors on students' poor grade point averages as they moved from elementary school to middle school. Results showed that parent involvement was not the only predictor of achievement but that the combination of parent support, student perceived teacher support, and students' feelings they belonged at the school each predicted higher grade point averages (Mackety & Linder-VanBershot, 2008).

Shaver and Walls (1998) suggest that parent involvement, regardless of socioeconomic background or a child's gender, influences student academic achievement. This descriptive study uses data from school records and student test scores to examine the parent-school involvement on 2<sup>nd</sup> through 8<sup>th</sup> graders' reading and mathematics achievement. The study revealed that students with involved parents were more likely to have higher achievement gains. Poverty has been found in other studies to

be negatively related to academic growth (Mackety & Linder-VanBershot, 2008), yet the parents' socioeconomic status did not influence the level of parent-school involvement in this study.

Children's academic success depends on the degree to which teachers understand and accept the divergent cultures of the families they serve (Lazar & Slostad, 1999). When families of diverse backgrounds are involved with the school, teachers become more aware of cultural issues and are more likely to engage in meaningful and effective partnerships with families (Marschall, 2006; Bouffard & Stephen, 2007).

One study was found that examined cultural and parental influences on American Indian academic achievement. Leveque (1994) observed that parent involvement and family absorption of cultural patterns provided the strongest link to academic achievement of Navajo and Pueblo students in a California district.

Gajar & Matuszny (2002) compared the perceived needs of American Indian and non-American Indian parental involvement in the Individualized Education Program process. Results of this study showed American Indian/Alaska Native parents of children with disabilities were involved in the education of their children by attending school events, helping their children with homework, establishing a home learning environment, receiving information from the school and volunteering at school. They also found that the majority of the parents always attended the scheduled IEP meetings.

### Why Parents Get Involved

Hoover-Dempsey & Sandler (2005) identify three constructs that influence parent involvement in children's education: 1) parents' perception of their role, 2) parents' sense

of efficacy and, 3) parents' perception of the invitations, demands, and opportunities for school involvement (Ingram et al., 2007). Parents' beliefs that they can affect their children's education; parents' perception of their role in their child's development; parents' belief that the school desires their help; and parents' comfort level have all been claimed as predictors of parent involvement (Sheldon, 2002).

Parent Perception of Their Role in Children's Education. Parent decisions to be involved in children's education are influenced by their belief about what parents are supposed to do in relation to their children's education (Hoover-Dempsey & Sandler, 1997). Parent's perceptions of the roles they should play in their children's education and their beliefs that their involvement can affect their children's education have been shown to predict actual involvement at home and in schools (Sheldon, 2003; Hoover-Dempsey, Bassler, & Brissie, 1992; Sheldon, 2002). Research has shown that a parent's beliefs and expectations for success in mathematics predict achievement in elementary and middle school mathematics (Sheldon & Epstein, 2005; Gill & Reynolds, 1999; Halle, Kurtz-Costes, & Mahoney, 1997).

Mackety & Linder-VanBerschot (2008) reported parents in their study identified four kinds of school-oriented involvement in which they participated. Five focus groups, each consisting of four to sixteen parents were interviewed by the researchers, all perceived communication with the school and attending school events as ways to be involved in their children's education. Four of the five focus groups reported volunteering and advocating for their children as ways to be involved. The focus groups also reported six types of home-oriented involvement. Five of the five focus groups

reported showing and interest in children's education and helping with school work as ways to be involved at home. Four of the five groups perceived encouraging and rewarding their children to do their best and reading with their children as ways to be involved at home. Three of the five groups reported meeting their children's basic needs and involving the extended family as ways to be involved at home.

Parents' Sense of Efficacy. Self-efficacy is the belief that one has the power to produce a desired effect (Bandura, 1997). Parent's decisions to become involved are influenced by their ability to help their children succeed in school (Hoover-Dempsey & Sandler, 1997). Parents' beliefs about their own effectiveness as teachers or tutors (their "sense of efficacy") shape parent involvement, especially for parents of older children (Lazar & Slostad, 1999). Family members need to explore two aspects of their children's education: 1) their expectations of their children and 2) their self-efficacy in helping their children succeed in the goals (Ferguson, 2008).

Parents' Perception of Invitations and Opportunities for School Involvement. Teachers' encouragement of parents to be involved in their children's education predicts greater parental involvement, even in those families considered hard to reach (Sheldon, 2003; Balli, Wedman, & Demo, 1998; Dauber & Epstein, 1993). When teachers reach out to families in a comfortable, encouraging manner, parents are likely to become more involved in helping their children be successful in school (Sheldon, 2003). Balli (1998) found that families are more likely to be involved with homework when their children's teachers asked them to be involved.

Mackety & Linder-VanBershot (2008) reported American Indian parents described communication between home and school as talking with teachers and principals, visiting the school, emailing teachers, visiting the school web site, talking with school board members and the superintendent, attending parent-teacher conferences, and soliciting feedback from teachers. Every focus group in their study reported communication as a type of school-oriented involvement. Agbo (2007) found there is a need for more effective communication and a greater understanding between the people in the community and the school staff. These would occur through trust-building, friendship, and understanding on the part of teachers.

Ferguson (2008) explains that creating a sense of welcome - a welcoming environment that fosters family-school partnerships - transcends context, culture, and language. That sense of welcome has a direct effect on parents' involvement in their child's education (McGrath, 2007; Phillipson & Phillipson, 2007; Stewart, 2008). When family members feel invited, and believe they have the knowledge and skills to support their children's education, they are more likely to be engaged in their children's educational activities (Ferguson, 2008).

Emerging research shows that principals and superintendents play an essential role in building family involvement (Bouffard & Stephen, 2007). Principals' and superintendents' outreach to families sends home the message that families are welcome and important partners in increasing achievement (Bouffard & Stephen, 2007; Van Voorhis & Sheldon, 2004).

Teacher outreach to parents can result in strong, consistent gains in both reading and mathematics (PAC, 2007). If schools hope to increase achievement test performance

in mathematics, they need to plan family involvement activities that encourage interactions between students, families, and the mathematics curriculum (Sheldon & Epstein, 2005). For all students to increase their achievement in mathematics, educators must support and facilitate parent involvement (Sheldon & Epstein, 2005).

Family Status Variables. Family status variables, including socioeconomic status, do not fully explain parent reasons for becoming involved in their child's education; thinking and action related to this involvement; or the value they place on education (Hoover-Dempsey & Sandler, 1997). Research suggests parent involvement is more a function of parental beliefs and school outreach than of family demographics (Sheldon, 2003; Hoover-Dempsey & Sandler, 1997).

Social scientists report that parent involvement in school activities is lower among low-income and under-represented families due to feelings of alienation, distrust, or cultural devaluation (Sanders et al., 1999). Others challenge this by showing there is a wide variation in the nature and quality of the involvement of less educated parents; and that, when teachers help them, parents of all backgrounds can be involved productively (Epstein & Dauber, 1991). A solid body of research finds that families of all income and education levels, and from all ethnic and cultural groups, support their children's learning (PAC, 2007).

Supporting all families is crucial to improving learning and decreasing the achievement gap. Increasing involvement of families in the education of children is particularly important for schools serving low-income and other at risk students (Funkhouser & Gonzales, 1997). Encouragement of all families to be more involved at

school and home, and better informed about what their children are learning must become a widespread goal (PAC, 2007).

### How Parents Get Involved

Epstein's (1995, 2001) theory of partnerships leads to a framework of how parents get involved in their children's education. Her model directs attention to reciprocal influences among teachers, children, and families (Balli et al., 1998). Epstein visualizes the family, school, and community as "spheres of influence" that can be drawn together or pushed apart depending on the policies, beliefs, and practices of each context (Sheldon, 2003). Epstein's model of overlapping spheres of influence recognizes that educational systems and families conduct many activities separately, but they also conduct activities jointly (Balli et al., 1998).

Epstein identifies the six types of involvement for successful school, family, and community partnerships including: parenting, communicating, volunteering, learning at home, decision making, and collaborating with the community. Each type of involvement leads to different results for each group -- students, families, teachers, and schools. A balanced program of the different types of involvement can be created to meet every school's goals. Certain practices influence children's achievement, while others affect behaviors and attitudes (Epstein, 2001).

Henderson and Mapp (2002) developed a different framework that explains that some forms of parent involvement (e.g., volunteering and attending school events) have little impact on student achievement. Three family involvement processes have been found to be critical for middle school youth's academic achievement: parenting, home-



school relationships, and responsibility for learning (Kreider et al., 2007).

Parenting. Supportive parenting includes parent's attitudes, values, and child-rearing practices. Positive aspects of parenting operate within the family and between the family and school (Pantin, Coatsworth, Feaster, Newman, Briones, Prado et al., 2003; Coatsworth, Pantin, McBride, Briones, Kurtines, & Szapocznik, 2002). Research suggests the home environment is a powerful predictor of student achievement. Because of the amount of time children spend in the home environment, it appears parents can have a significant impact on student achievement (Cancio, West, & Young, 2004). The home environment is as critical to a student's educational functions as the quality of teachers or curricula (Cancio et al., 2004).

Home-School Relationships. Home-school relationships are the formal and informal connections developed between school and family (Kreider et al., 2007). Schools must create an environment that welcomes families and encourages them to ask questions and voice concerns, provides parents with information and the training necessary to become involved, and reaches out to parents with invitations to participate in their children's learning (Funkhouser & Gonzales, 1997).

Home-school relationships provide parents with information they need to support their children's education, convey parents' beliefs about the importance of education to their children and the school, and lay the foundations for all other forms of involvement (Bouffard & Stephen, 2007; Kreider et al., 2007). A web of support is created to provide students the best opportunity to thrive in school when parent-teacher partnerships are based on genuine respect and through a mutual sharing of ideas (Lazar & Slostad, 1999;

Epstein & Dauber, 1991).

Communication between home and school is the foundation of a successful home-school partnership (Barrera & Warner, 2006). When parents and teachers communicate effectively, positive relationships develop, problems are more easily solved, and students make greater progress (Barrera & Warner, 2006).

In 2001, the Northwest Regional Education Laboratory reconvened a panel of master American Indian/Alaska Native educators to update previous recommendations of effective practices in American Indian education. In the 2002 NWREL report, *Learn-Ed Nations Inventory*, the panelists advocated for a systematic approach and set forth four recommendations. One of the recommendations was to develop an effective tool to measure the how the school community is doing in relation to American Indian/Alaska Native students. Section three of the inventory they developed gathers baseline data about parent and community. Each indicator can be rated as significant, developing, not present, or not applicable. The indicators are as follows:

- Communication is two-way, frequent, and respectful.
- Parents and community are represented in school leadership structures.
- Parents and community are involved in meaningful ways.
- School/staff communicate to parents/community members that they need not be highly schooled for students' learning to benefit.
- Parents and community members acknowledge they play important roles in creating and sustaining a quality, culturally responsive learning environment at school, at home, and in the community.

- Vigorous outreach activities are conducted to inspire and increase parent/community involvement.
- The community is a source for “real world” learning experiences for students.

There is room on the form to briefly state the evidence found that the indicator is present.

This tool is then supposed to be used to start conversations about how to improve the schools’ work with American Indian/Alaska Native students.

Responsibility for Learning. Responsibility for learning refers to homework management, educational expectations, and encouragement for post-secondary education. Activities related to responsibility for learning provide information to families about how to support their children at home with homework and other curriculum-related activities. Parental encouragement and help managing homework helps middle school students complete homework more accurately and develop self-monitoring skills. The benefits to homework management hold true for low-income, rural, and under-represented students (Bouffard & Stephen, 2007).

High expectations significantly influence many academic benefits, including increased mathematics and reading scores and achievement growth (Jeynes, 2003; Zhan, 2006). When adolescents perceive high expectations from their parents, they are more interested in school, have higher academic motivation, and higher achievement goals (Gonzalez-DeHass, Willems & Holbein, 2005; Bouffard & Stephen, 2007). High expectations may be the most important influence for the most at-risk students (Bouffard & Stephen, 2007).

## Interactive Homework and Support Network

### Homework

Parental engagement in children's homework is an example of the most direct and face-to-face form of parental involvement. It communicates affection, nurturance, and support while facilitating a child's overall sense of well-being (Balli et al., 1998). Parental involvement is one element of homework design that encourages students to spend more time on problems and complete more homework with higher accuracy (Epstein, 2001; Hoover-Dempsey, Battiato, Walker, Reed, DeJong, & Jones, 2001; Cancio et al., 2004).

Students benefit from spending time on homework (Van Voorhis, 2001). Studies suggest positive relationships between time spent on homework, completion of homework, and student achievement (Van Voorhis, 2001; Keith, Keith, Troutman, Bickley, Trivette, Singh, 1993). Time spent on homework is only one of the factors that have been shown to increase achievement. Homework completion is another area of research that has found positive outcomes. Most studies conclude that students who complete their homework have higher grades and higher achievement test scores than those who do not complete their homework (Paschal, Weinstein, Walberg, 1984, Van Voorhis, 2001). Parent-child discussions have resulted in higher rates of homework completion and achievement in the middle school years (Van Voorhis, 2001; Fehrmann, Keith, & Reimers, 1987; Ho & Willms, 1996; Keith et al., 1993). However, studies have shown that parent-child discussions can also hinder completion of homework or cause stress within the family (Van Voorhis, 2001).

Why Teachers Assign Homework. There are many reasons teachers assign homework (Corno, 2000; Muhlenbruck, Cooper, Nye, & Lindsay, 2000). Epstein & Van Voorhis (2001) revealed ten broad purposes of homework: practice, preparation, participation, personal development, parent-child relations, parent-teacher communications, peer interactions, policy, public relations, and punishment. These purposes are not mutually exclusive and can be combined in one assignment. Assignments designed for these ten purposes help increase achievement, develop home-school relationships, and improve teaching practices (Epstein & Van Voorhis, 2001; Cancio et al., 2004). Van Voorhis (2001) points out that assigning homework for punishment is not seen as a valid purpose by teachers today.

Homework Management. Families can show the importance of homework by valuing homework, monitoring homework, and assisting and interacting with the homework (Scott-Jones, 1994). Research consistently reports that practically all parents know they should monitor their children's homework and view homework as an important part of the educational process (Epstein & Van Voorhis, 2001). Parents of middle and high school children, though, are less likely to be directly involved in the homework process than parents of elementary students (Bouffard & Stephen, 2007). When parents guide their children's homework with helpful and appropriate support, children tend to perform better in the classroom (Casper et al., 2007; Hoover-Dempsey et al., 2001; Walker, Hoover-Dempsey, Woetsel, & Green, 2004).

Children are more likely to view homework as helpful when parents have a positive attitude toward homework and use homework as an opportunity to teach study

skills and time management (Casper, Lopez & Wolos, 2007; Cooper, Jackson, Nye, & Lindsay, 2001). The encouragement parents give to their children, and their help managing homework, aids adolescents with completing homework more accurately and developing self-monitoring skills (Bouffard & Stephen, 2007; Zhan, 2006).

### Interactive Homework

Balli (1995) conducted a quasi-experimental study of 74 suburban 6<sup>th</sup> graders explored the effects of TIPS math interactive homework. In this study, three classes with the same teacher were assigned mathematics homework with identical content, but that varied in guidelines for parental involvement. Through reported levels of involvement, surveys, phone surveys, and a posttest after 20 assignments were completed, this study of TIPS mathematics homework revealed that parents of middle school students appreciated the student-guided interactions. Both students and parents reported more positive conversations about mathematics, while students believed the conversations led them to be more prepared and successful in mathematics classes (Epstein & Van Voorhis, 2001). TIPS provided a tool for all participants to increase their positive attitudes about homework and increase the number of opportunities to celebrate positive accomplishments at school (Epstein & Van Voorhis, 2001).

According to Epstein & Van Voorhis (2001), TIPS interactive assignments a) increase students' ability and willingness to talk about schoolwork at home, b) increase students' knowledge of the uses of school skills in the real world, and c) improve students' skills and homework completion (Epstein, 2001). Family members can a) increase their awareness of what their children are learning in school; b) increase their

confidence in talking to their children about homework, and c) increase family involvement in learning activities at home (Epstein, 2001). Teachers are enabled to design assignments that help students share their work with their families and can increase their positive attitudes about family interest in their children's education (Epstein, 2001).

In a study (2000) that teased out the influence of different aspects of TIPS, the authors concluded that the TIPS process is successful because:

- TIPS can be used with any curriculum.
- Teachers are able to better organize and design focused assignments.
- The process connects home and school.
- TIPS involves active learning by students sharing and demonstrating skills.
- Links to the real world are provided.
- Information is provided to all families.
- The emphasis is on mastery of basic and advanced skills.

(Epstein, Van Voorhis, & Salinas, 2000). These conclusions were based on collection and interpretation of a series of studies by Epstein, Simon, & Salinas (1997); Balli (1995); Balli, Demo, & Wedman (1997); and VanVoorhis (2000).

Each of the studies focused on a different content area. The Epstein, Simon & Salinas study, with a focus on language arts, was a one-year longitudinal study of 683 students and 218 parents of predominantly poor African American families. Through reported levels of participation, writing samples, report cards and surveys, they concluded

that the more TIPS assignments families completed, positively influenced report card grades. The Balli, Demo, & Wedman studies were quasi-experimental studies with a focus on mathematics, as described in the section above. The VanVoohis study was also a quasi-experimental study using 253 students and 180 family partners with a focus on science. This study concluded that families were more involved in homework when there were homework assignments with parent prompts.

### Curricula and Research Tools

#### Family Intervention

When efforts to create an intervention program are designed to meet the needs of the community, there is an increase in support for student learning and involvement from outside the school (Barajas & Ronnkist, 2007; Weiss, Mayer, Kreider, Vaughan, Dearing, Hencke, & Pinto, 2007). Efforts to increase parent involvement in school-related activities are most effective when sustained over a long period of time (Balli et al., 1998).

Family Mathematics Programs. Support for all families needs to be a part of any family involvement program. Workshops for parents on how to help their children are linked to higher achievement in mathematics and reading (Commissioner's Parent Advisory, 2007). Family Math and Math and Parent Partnerships in the Southwest (MAPPS) are two programs where families can come together and learn about mathematics while being involved in middle school mathematics workshops or mini-courses designed to meet their needs. Family math nights are another support tool that is designed around the fun of learning mathematics as a family.



Family Math. The Family Math program from the University of California-Berkeley focuses on families and children learning mathematics together (Stenmark, Thompson, & Cossey, 1986). The aim is for families, regardless of their prior mathematics experiences, to engage and be successful in meaningful mathematics, and for parents to support and advocate for their children's mathematics education (Thompson & Mayfield-Ingram, 1998). The goals of the program are to a) provide parents activities to help their children learn mathematics at home; b) provide parents with information about the importance of mathematics in their children's future; c) inform families about equity issues in mathematics; d) inform parents that mathematics is important for all students; e) build awareness that mathematics is about more than computation; f) develop problem solving math discussion skills; g) build a positive attitude about mathematics; h) help parents realize they are important and can make a difference in their children's education; and i) provide an opportunity for all members of a family (Thompson & Kreinberg, 1986).

Family math nights engage families in rich mathematics in an informal setting. The goal of family math night is to strengthen students' mathematical aptitude through the power of family. Families serve as role models of motivation, persistence, and competency during these sessions filled with mathematical thinking and communication (Taylor-Cox & Oberdorf, 2006).

MAPPS Mini-courses and Parent Workshops. Math and Parent Partnerships in the Southwest (MAPPS) from the University of Arizona have designed mini-courses and workshops that last one to two hours and gives families opportunities to develop problem

solving skills and build an understanding of mathematics with a hands-on approach. The MAPPS mini-courses and workshops are designed to provide professional development for parents (Civil, Bernier, & Quintos, 2003). Parents work on tasks similar to what is being seen in the classroom, while working in groups, sharing their ideas, using manipulatives and calculators, and applying other strategies used in today's mathematics classrooms (2003). MAPPS mini-courses contain eight two-hour classes on a main topic of middle school mathematics. The workshops are two-hour stand-alone sessions on individual mathematics topics. The goals of MAPPS are to: a) engage parents of K-12 children in the mathematics seen in schools; b) empower parents with new mathematical knowledge and new self-confidence about learning mathematics; c) create families that learn math together; d) improve children's mathematical competencies; and e) get the broader community to embrace the idea that mathematics is something everyone can do and enjoy (2003).

### Research Tools

Parent Survey. The *Parent Survey of Family and Community Involvement in the Elementary and Middle Grades* (See Appendix A) is a seven page, easy-to-read survey of parents that includes seven sections with over eighty items of information on family attitudes about the school; family practices of involvement in their child's education; school practices to inform and involve families; information desired by families about children, classes, schools, and community services; homework patterns; family background and experiences; and open-ended comments.

Scales formed for the study sample were tested for internal reliability (see

Appendix B) by the original survey designers. See Appendix C for the FAME Parent Survey Scales and Reliability Coefficients. The reliability of a scale can be reported in terms of the internal consistency of scores on items that purport to measure the same concept. The Cronbach alpha ( $\alpha$ ) formula was used because the survey includes many Likert-type items (Mueller, 1986). The alpha reliability formula reflects the intercorrelation of a set of items, accounting for variations in responses to the items.

The Reliability statistical procedure in SPSS provides item means and variances, the matrix of inter-item correlations, scale statistics, item-to-total statistics showing the effect on the internal reliability of the scale if any one item were deleted, and the alpha coefficient (SPSS, 1990). With these statistics, decisions were made about the strongest set of items for each of the scales. In most cases, weak items were omitted by the original designers if they substantially reduced the reliability coefficient.

Reliable scales that combine items that measure similar concepts permit efficient analyses of survey data. These surveys include scales for parents' general attitudes, overall school programs, overall family practices, and subscales of some of the major types of involvement that create a comprehensive program of partnership (Epstein, 1992). These major types of involvement include parenting workshops, home and school communications, and parent-teacher conferences. The reliabilities of the parent scales range from modest ( $\alpha=.64$ ) to very high ( $\alpha=.96$ ), indicating their usefulness for research purposes (Epstein, Salinas, & Horsey, 1994).

The School's Contact with You section of the survey includes parents' reports of how well their school invites parents to be involved at school; communicates about children's progress; encourages parent-child interactions on homework; and strengthens

connections with the community. The School Climate section asks parents to rate the extent to which they believe their child attends a good school that welcomes and cares for parents and children. The Parental Involvement section is a set of measures asking parents to report the frequency with which they engage in their child's schooling in various ways.

The Parental Role Construction section measures the extent to which an individual believes that parents should be involved in children's education and schooling. The Parental Efficacy section measures the extent to which parents feel that their involvement can make a difference in their child's education. The Parents' Social Networks- Topics of Conversation with Other Parents section measures the extent to which a parent talks with other parents about the school, teachers at the school, and other topics relevant to their children's education.

Student Survey. The *Student Survey on Family and Community Involvement in the Elementary and Middle Grades* (See Appendix D) is a six page, easy-to-read survey of students that includes seven sections with over fifty items of information on student attitudes about the school, views of parent involvement, perceptions of the partnership climate at their school, and individual and family demographics.

The original survey designers tested the student survey scales were for internal reliability (see Appendix E). See Appendix F for the FAME Student Survey Scales and Reliability Coefficients. The reliability of a scale can be reported in terms of the internal consistency of scores on items that seem to measure the same concept. The Cronbach alpha ( $\alpha$ ) formula was used because the survey includes many Likert-type items (Mueller,

1986). The alpha reliability formula reflects the intercorrelation of a set of items, accounting for variations in responses to the items.

The Reliability statistical procedure in SPSS provides item means and variances, the matrix of inter-item correlations, scale statistics, item-to-total statistics showing the effect on the internal reliability of the scale if any one item were deleted, and the alpha coefficient (SPSS, 1990). With these statistics, decisions were made about the strongest set of items for each of the scales. In most cases, weak items were omitted by the original survey designers if they substantially reduced the reliability coefficient.

Reliable scales that combine items that measure similar concepts permit efficient analyses of survey data. The reliabilities of the student scales range from modest ( $\alpha=.68$ ) to high ( $\alpha=.86$ ), indicating their usefulness for research purposes (Sheldon & Epstein, 2007b).

The Student Motivation and Attitudes section of the survey includes students' reports of their self-competence in their ability to learn and succeed in school and their sense of belonging at their school. The sense of belonging refers to students' feelings of being included, accepted, and valued at school. It is believed that the feeling of belonging is an important influence on students' ability and motivation to learn (Sheldon & Epstein, 2007a).

The View of Parent Involvement section assesses students' feelings about the parent involvement interactions they experience. The Parental Involvement section is a set of measures asking students to report the frequency with which a parent engages in their schooling in different ways. School and Family Connections measures the extent to which the school and/or teachers have a relationship with their parents, and whether

teachers assign work that requires students to interact with their parents.

### Barriers

Although it is impossible to attribute student achievement gains solely to parent involvement activities, it does appear that schools that make parent involvement a priority see an increase in student achievement (Funkhouser & Gonzales, 1997). The potential benefits of parent involvement in children's education are significant (e.g., higher grades, test scores, and graduation rates; better school attendance; increased motivation; improved self-esteem; lower rates of suspension; decreased use of drugs and alcohol; fewer instances of violent behavior; and greater enrollment rates in postsecondary education), but there are formidable barriers (Ingram et al., 2007).

Annette Lareau (1987) argued that class-related cultural factors play a part in teachers' requests for parent involvement. One question she studied was how social class influences the process through which parents participate in their children's schooling. Her analysis and conclusions were based on an intensive study of home-school relationships of children in a white working-class school and an upper-middle-class school.

Lareau's study involved participant-observations at two different classrooms in two different communities. Along with the observations, she conducted interviews of parents, teachers, and principals over a two-year period. The first classroom was in a working-class community, and was chosen because the majority of the parents were high-school drop-outs, employed in skilled or semi-skilled jobs, paid by the hour, and was occasionally unemployed. The second group, in a middle-class community, was chosen because the parents were mostly college graduates with professional jobs and who were

less vulnerable to economic changes (Lareau, 1987).

Lareau found that parents in both communities valued educational success; they all wanted their children to succeed and felt they contributed to that success. The two groups differed only in the level of education they hoped their children would attain. In the working class community, the education of their children was put into the hands of the educators. By contrast, the middle-class community felt the education of their children was an endeavor they shared with the educators.

Generally, the evidence demonstrated that in both situations the level of parental involvement was linked to the class position of the parents. The working-class parents had poor educational skills and limited time and income to supplement the learning going on in the classroom. The middle-class parents, on the other hand, had high educational skills and the time and income to support their children's learning outside the classroom. Lareau recommended that schools that want to establish home-school partnerships need to address the issue of social class differences through boosting the educational capabilities and information resources of parents.

Stevenson and Baker (1987) used a nationally representative sample of American households to examine the relationship between parental involvement in schooling and the child's performance. They sampled 179 children, parents, and teachers to investigate if the educational level of the mother was related to parent involvement; if the age of the child was related to parent involvement; and if children whose parents are more involved do better in school.

In an analysis of cross-sectional data, the researchers found that a) the educational level of the mother is related to the degree of parent involvement, so that

when the mother has more education the parents are more involved; b) parent involvement is related to achievement; and c) parents are more involved in their younger children's education than in their older children's education (Stevenson & Baker, 1987). They also found that the mother's education level and the age of the child is a better predictor for boys than for girls. They did not find, though, a direct effect of maternal education status on performance independent of parental involvement in school activities.

In a meta-analysis of the relation of parental involvement to urban elementary school student achievement, Jeynes (2005) found a significant relationship between overall parental involvement and student academic achievement. This meta-analysis of 41 studies examined the relationship between parental involvement and the academic achievement of urban elementary school children. The analyses determined the effect sizes for parental involvement overall and by subcategory of involvement.

Barriers to home-school relationships identified in the literature include parents' lack of knowledge about how to help with schoolwork or support learning at home (Sheldon & Epstein, 2005; Epstein & Van Voorhis, 2001); parents' negative attitudes about school (Jones, 2001); societal pervasive barriers such as lack of time and money; poverty (Anderson & Minke, 2007; Sheldon, 2003); single parenthood; non-English literacy (Sheldon, 2003); cultural gaps between home and school (Auerbach, 2007; Glick & Hohman-Marriot, 2007); a lack of teacher training in parent involvement (Sheldon & Epstein, 2005); and teachers' negative attitudes and inaccurate assumptions about parents (Lazar & Slostad, 1999). When families feel overwhelmed by requests from schools, they will resist unless there is a support network in place (Ferguson, 2008; Weiss et al., 2007). A lack of opportunities for parents to develop a real sense of support contributes to these



barriers (Indian Nations at Risk, 1991).

Family practices vary within any group of parents (Epstein & Dauber, 1991; Hoover-Dempsey et al., 1987; Stevenson & Baker, 1987). Some studies have shown that teachers often misinterpret a parent's lack of involvement as a lack of caring about their children's education, even though evidence suggests this is not the case (Marschall, 2006; Carger, 1997). There are valid reasons for family members not to attend or engage in school activities, and a teacher's misinterpretation of a parent's lack of involvement can lead to misconceptions (Ferguson, 2008). Misconceptions among stakeholders continue to play a significant role in the effectiveness of family involvement programs because misconceptions lead to mistrust (Bakker, Denessen, & Brus-Laven, 2007; Caspe & Lopez, 2006). Identifying misconceptions that teachers and families hold about the beliefs of each other leads to trust (Ferguson, 2008).

## CHAPTER 3

### METHODOLOGY

This chapter describes the design of this study and provides contextual and background information necessary for understanding the objectives of the study, the selection and use of research methods, and the methods of data collection and analysis.

This research involved a mixed-methods design utilizing both quantitative and qualitative techniques. This chapter includes a discussion of the recruitment, sampling, data collection and data analysis methods that were used in this study, as well as a detailed description of the interventions. My background and roles in the study are also described.

#### Context of Study

##### Communities

The students come to this middle school from two towns and the large rural area that surrounds them. The town the middle school is located in is a community of approximately 3400 residents bordering an American Indian reservation in the western United States. The second town is located fifteen miles from the school and is the tribal headquarters. The district covers a vast area of approximately 2100 square miles which is a rural geographic area over twice the size of the state of Rhode Island.

The town the middle school located in is surrounded by productive ranches and farms. Tourism is a big part of the industry and coal mining also contributes to the local economy. There are services available in the town, such as a grocery store and pharmacy,

a discount store, and miscellaneous small businesses such as a farmer's coop, a single-screen movie theater, several hotels and restaurants and some fast food eateries. For any other needs the residents must drive fifty miles to the nearest city. The estimated median income is \$35,641 compared to Montana's estimated median income of \$43,531 and a national median income of \$50,740 (Hardin Chamber of Commerce, 2009).

The second town has approximately 1500 residents and is the capital for this American Indian reservation. In addition to the tribal headquarters, the town boasts a tribal college serving about 300 students per semester and a K-5 school. The majority of employment is supplied by the tribe and federal programs. There are no services here except a post office, convenience store, a cafe and a small grocery. The residents here have to drive about 65 miles to the nearest city or about 15 miles to the town the middle school resides in. The estimated median income is \$30,027 and the percent of residents with an income below the poverty level is approximately 41 percent.

The district covers a vast area of approximately 2100 square miles. The farthest feeder school to the middle school is located forty-five miles south of the middle school. There is one feeder school fifteen miles away and the other feeder schools within the district are in the same town as the middle school. There are students who attend the district schools from outside the district as far as seventy miles away. The area consists of vast rolling hills, mountain ranges, trout filled streams and large stretches of grazing lands. The winters are harsh, creating difficulties for many students to make it to school.

### The Middle School

The middle school serves approximately 365 students in grades six through eight

coming from 330 families. The ethnic composition of the school is approximately 70 percent American Indian students with approximately 25 percent Caucasian students and 5 percent students of other ethnicities.

The middle school was involved in its third year of restructuring during the 2008-2009 school year, meaning this was the seventh year the school did not make Adequate Yearly Progress according to state and federal guidelines. In the 2008-2009 school year, 29 percent of all students were proficient in mathematics, with large differences evident when the results are disaggregated by ethnicity. Five percent of the American Indian students were advanced in mathematics, and 16 percent were proficient in mathematics. By comparison, 17 percent of the Caucasian students were advanced in mathematics and 34 percent were proficient.

During the 2008-2009 school year, the middle school reported 71 percent of their students were free/reduced lunch participants. Four percent of the free/reduced lunch students were advanced in mathematics, and 18 percent were proficient. Of the students not participating in the free/reduced lunch program, 18 percent were advanced in mathematics with 28 percent proficient.

### The Mathematics Curriculum

A traditional mathematics curriculum is used at the middle school. Manipulatives are available in all of the mathematics classrooms and training has been provided for the teachers to effectively use the manipulatives. The school has two computer labs, one used exclusively for the PLATO software system which allows the students to work independently on deficiencies or to enrich their mathematics. The school also has three

rolling labs that can be used for other mathematics programs or the PLATO system.

Graphing calculators are available in every classroom. The Accelerated Math software program, published by Renaissance Learning, has been introduced to the school and is available in the classrooms.

Through eighteen years of experience as a mathematics teacher, professional development participant and provider at the middle school level, I have explored a variety of teaching styles and pedagogies, and have had opportunities to observe the mathematics teaching practices of other teachers at the middle school. Through these experiences, I would state that in general the teachers teach in traditional ways. Each of the teachers has had training on differentiation of instruction, but few actually use it to meet the varied needs of their students. There has been a push for common assessments to track areas of concern on the state testing and the teachers have been working on this goal. Students have made little to no gains on the state mathematics assessment since 2002.

### Research Design and Methods

#### Research Purpose and Specific Research Questions

The purpose of this study is to document the process of implementing the Families Achieving Mathematical Excellence (FAME) program, a family involvement program at a rural school located near an American Indian reservation, and serving a large proportion of American Indian families and families with low income. The goal is to obtain a comprehensive understanding of the process of implementing a program designed with this particular setting in mind. This comprehensive understanding includes the effectiveness of different program components and how these effective components

link to this unique context.

The principal research questions of this study are:

1. Prior to involvement in FAME, how do students and families perceive the families' role in mathematics education?
2. How does the process of implementing the FAME program evolve over time?
  - a. What barriers and unexpected issues arise?
  - b. What adaptations become necessary, and why?
  - c. What features of the program are most effective?
3. How do families respond to and participate in the FAME program?

### Research Design

The design of this study follows the mixed-method framework outlined by Creswell (2009) and defined as a concurrent triangulation strategy. A concurrent mixed-methods design was utilized in order to collect diverse types of data and to combine both a qualitative and quantitative approach within study. Both approaches were conducted simultaneously, and equal weight was given to both aspects of the research. The results of the qualitative and quantitative data collection were analyzed separately, and then brought together to be synthesized as a single study.

In the mixed-methods approach, the researcher bases the inquiry on the assumption that collecting diverse types of data provides the most comprehensive and accurate understanding of the research problem. Such studies often begin with a broad survey in order to generalize results to a population and then focus, in a later stage, on qualitative, open-ended interviews to collect detailed views from participants (Creswell, 2009). This study followed another tradition of the mixed methods design of inquiry by

using closed-ended survey questions, a semi-structured interview protocol and open-ended observations.

### Methods of Data Collection

Several forms of data were collected to answer the research questions. Prior to implementation of the FAME program, data was collected through parent and student surveys to characterize parent and student perceptions of family involvement in mathematics. The data was used primarily to answer the first research question, “Prior to involvement in FAME, how do students and families perceive the families’ role in mathematics education?” The results of this survey were summarized using descriptive statistics. Program attendance data, was collected throughout the year and was summarized using descriptive statistics.

To answer the remaining research questions, qualitative data was gathered to document and describe the implementation and evolution of the FAME program over a two-semester period. My field notes and observations, participant evaluations of each program activity, and comment sheets completed by adult family members after completing TIPS homework activities, were used to describe how families responded to the various components of the FAME program. Finally, interviews were conducted with selected participants to further explore perceptions of family involvement in mathematics. Figure 1 provides an outline of data collection methods, which are described in detail below. A description of the sampling methods is given within each method of data collection.

Research Question	Relevant Program Feature/Event	Available Data for Collection and Analysis
1. Prior to involvement in FAME, how do students and families perceive the family's role in supporting mathematics learning?	<b>Pre-program</b> – Survey sent to all involved families and students	<b>Parent/student surveys</b> – quantitative data summarized through descriptive statistics paints a picture of parent-student attitudes and behaviors prior to participating in FAME
2. How does the process of implementing the FAME program evolve over time? What barriers and unexpected issues arise? What program adaptations are needed? What program features are most effective?	<p><b>a) Family math nights</b> – Monthly, two-hour activity-based events with a focus of a mathematics strand the students are working with in the classroom. Designed for all age groups and ability levels.</p> <p><b>b) Math mini-course</b> – Eight weekly, two-hour sessions designed to give adult family members an opportunity to increase their content knowledge. Each eight-week session is based on a specific mathematics content area: -Geometry -Numbers -Algebra -Fraction, Decimal, Percent</p> <p><b>c) Math workshops</b> – These are one-time, two-hour blocks focusing on a single topic: -Distance Around -Patterns and Equations -Proportional Reasoning -Probability -Geometry: Netting -Problem Solving -Spatial Sense</p> <p><b>d) TIPS with family partners</b> – These are bi-monthly parent-supported homework assignments; related to class material.</p>	<p><b>a) Research notes</b> – these are researcher observations and reflections recorded in a journal over the two-semester period of intervention.</p> <p><b>b) Attendance data</b></p> <p><b>c) Family math post intervention evaluations</b> – These post-intervention evaluations consisted of two sections to gauge participants' perceptions of workshop logistics as well as what they learned. The logistics section consisted of Likert-type questions asking about the set-up and delivery of the intervention. Two open-ended questions gave participants the opportunity to share their ideas about what they learned.</p>
3. How do families respond to and participate in the FAME program?	<p><b>Same data sources, viewed from a different perspective:</b></p> <p><b>a) Family math nights</b> <b>b) Math mini-course</b> <b>c) Math workshops</b> <b>d) TIPS with family partners</b></p>	<p><b>a) Research notes</b> <b>b) Attendance data</b> <b>c) Family math post intervention evaluations</b></p> <p><b>New data sources:</b> <b>d) Signed TIPS homework sheets</b> <b>e) Interviews with selected participants</b></p>

Figure 1. Research Design Table



### Family Involvement Surveys

Two surveys developed by the Center on School, Family, and Community Partnerships at Johns Hopkins University were selected for use in this study and were given to all families and students in the middle school. The first survey, *the Parent Survey of Family and Community Involvement in the Elementary and Middle Grades* - focused on parents' attitudes about the school; family practices of involvement in their child's education; school practices to inform and involve families; information desired by families about children, classes, schools, and community services; homework patterns; and family background and experiences. The second survey, *the Student Survey on Family and Community Involvement in the Elementary and Middle Grades* - addressed students' attitudes about the school, views of parent involvement, perceptions of the partnership climate at their school, and individual and family demographics. The development and validation of this survey is described in detail in Chapter Two.

Sampling Method. All middle school mathematics students and their families were involved in the survey portion of the study. Parent surveys were sent, via mail, to all families in the school. After ten days, reminder letters were sent home to the families to encourage more participation. All parent surveys submitted during the first month of the school year were included in the data analysis. Student surveys were given to all students who had a letter of consent on file. The letters of consent were sent home with the parent survey.

The *Parent Survey of Family and Community Involvement in the Elementary and Middle Grades* and the *Student Survey on Family and Community Involvement in the*

*Elementary and Middle Grades* was analyzed to produce descriptive statistics for each item. Answers were also disaggregated according to participant categories to see if any common themes emerge within the data.

#### FAME Family Math Evaluations

Expert and user feedback was incorporated in the design process of the FAME Family Math Evaluations. The evaluation instrument was initially developed by matching the expected behaviors for this situation with previously used instruments for similar situations (Creswell, 2009). The tool was based on short form evaluations used in certain mathematics and science workshops offered by a local university.

Next, a university faculty member with expertise in science and mathematics education, as well as instrument development, helped develop the survey in a user-friendly form. The survey was piloted with fifteen parents in early September 2008 using a mail-in format. These parents had all volunteered to review the evaluation tool and send back comments on clarity, grammar and spelling. Modifications for clarity, grammar and spelling were made based on the parental feedback. The final version of the survey was administered beginning in late September 2008 to all FAME participants.

The FAME Family Math Evaluations tool consisted of four closed-response items that measured participants' the usefulness of the information covered at the event and the organization of the event. The open ended-questions asked participants to 1) describe something they learned about the mathematics topic during the session and 2) add any comments to improve the FAME math event (see Figure 2).

FAME Math Night Evaluation		
Check to show if the FAME Geometry Math Night was:		
<input type="checkbox"/>	Not worthwhile	<input type="checkbox"/>
<input type="checkbox"/>	Somewhat worthwhile	<input type="checkbox"/>
<input type="checkbox"/>	Very worthwhile	
Check to show if the organization of the FAME Math Night was:		
<input type="checkbox"/>	Not well organized	<input type="checkbox"/>
<input type="checkbox"/>	Somewhat organized	<input type="checkbox"/>
<input type="checkbox"/>	Well organized	
Check to show if the FAME Math Night was:		
<input type="checkbox"/>	Too long	<input type="checkbox"/>
<input type="checkbox"/>	Too Short	<input type="checkbox"/>
<input type="checkbox"/>	Just about right	
Check whether you would recommend attending a FAME Math Night to another family:		
<input type="checkbox"/>	No	<input type="checkbox"/>
<input type="checkbox"/>	Yes	
Please write a few words about what mathematics you learned tonight:		
Please keep in mind that the FAME program is to help families in mathematics. Please include any comments you may have to improve the FAME Math Night:		
Thank you for attending the Geometry Math Night. I hope to see you at another function soon!		
Susie Bollinger		

*Figure 2.* FAME Math Evaluation

The questions were chosen to gather information on the components of the program that could be changed to better meet the needs of the participants. The evaluation form was intended to be modified as the program developed in order to collect the most pertinent information for this study. The evaluations, however, did not change as the original format proved to be efficient and continued to produce relevant responses, and it was helpful to participants to keep the routine the same.

These evaluations were given to all participants at each FAME event. Along with the materials for each session, evaluations were placed on each table for participants to

complete at the end of the session. The importance of completing the evaluation was explained prior to the end of the session. Time was planned into each session for participants to complete the evaluation while I began the clean-up and answered questions. Participants were asked to leave the evaluation at the sign-in desk as they left the meeting place. The response rate was high for both the open-ended questions (80 percent) and the closed-response questions (85 percent).

The post-event evaluations were analyzed two ways. Descriptive statistics were used to analyze the two-part evaluations. Inductive analysis (Patton, 2002) was utilized to discover significant patterns, themes, and interrelationships from the open ended responses. Specifically, the open-ended responses were read, reflective notes were made alongside the open-ended responses, and the data was coded. Using the assistance of word processing technology, the open-ended responses were then rearranged by grouping quotes or parts of quotes with the same or related codes (Maxwell, 2005), and the collections of quotes were reduced into categories that aided in capturing how FAME contributed to the participants' mathematical understanding.

Sampling Method. At the end of each Family Math event, evaluations were distributed to each individual in attendance. My intention was to receive back one evaluation form from each participant so my sample size would match the number of participants. Some families, though, chose to complete the evaluation form together which was in keeping with the spirit of FAME, but decreased the sample size.

### Teachers Involving Parents in Schoolwork (TIPS)

The purpose of collecting data on the TIPS homework assignments was to inform the teachers if their students understood the homework or needed extra help from the teacher, whether the assignment was enjoyable to parents and students at home, and if the activity informed parents about schoolwork in a particular subject.

As described in the intervention section of this paper, the *Home-to-School Communication* section of the TIPS homework assignments invited the family partner to record an observation, comment, or question for the mathematics teacher about the skill(s) demonstrated by their child. Once comments were made, parents were asked to complete the *Family Partner Signature section* requested on each activity.

Each TIPS assignment was recorded when returned and the evaluation was photocopied by the researcher. The written comments were given to the teacher and were recorded by the researcher. Coding occurred once the data was entirely collected to look for groups of comments that may be useful to the school and teachers to improve the interactive homework assignments.

The TIPS assignment family partner evaluation piece was categorized first by grade level and then by assignment. The Yes or No responses for the first four questions were tallied and frequencies were obtained. Responses to the open-ended questions were recorded and read the first time without any coding. During the second reading, main ideas were placed in the margin. These main ideas were then coded and emerging themes developed. Some codes were retained as coding continued, while others were combined or eliminated.

Sampling Method. The two sixth grade teachers and one seventh grade teacher assigned two TIPS assignments while the eighth grade teacher assigned four TIPS assignments to their respective students in the fall semester. These eight occasions resulted in the distribution of approximately nine hundred individual assignments. Of those nine hundred assignments, 224 TIPS assignments were returned to the researcher and used in the data analysis.

#### Research Journal Data

I kept a journal throughout the study to document obstacles to implementation, adaptations that were made to the program, and the successes of FAME program events. The journal contained thoughts about the progress of the program and stories told by participants as well as information about how and why changes were made throughout the program. The journal provided a place to record personal observation and reflection data throughout the study. Included in the journal were reflections and informal assessments written after each FAME event, as well as thoughts and observations about the overall program.

These research notes were recorded and analyzed with the goal of discovering which features of the program were most effective. Although they did not stand alone as a source of data, the research notes served as a form of validation, providing added insight and confirming evidence for findings discovered through the data collected from families and participants.

#### Interviews

Patton (2002) stated that interviews include open-ended questions and probes and

gave the researcher in-depth responses about people's experiences, perceptions, opinions, feelings, and knowledge. Upon the analysis of the evaluation data from the FAME math nights, interview questions were developed to clarify and extend the information found in the FAME evaluation data. The questions were developed to gain a clear understanding of how families responded to and participated in the FAME program. In this study, interviews took place at the conclusion of the FAME program for the school year.

The interviews were open-ended interviews (Patton, 2002) with the content and sequence of questions determined in advance. The open-ended questions were designed to elicit participant perspectives and experiences regarding their attendance and involvement in FAME events. Preparing questions in advance, based on evaluation data, provided a structure during the interview and helped to ensure the efficient use of interview time. The structured open-ended interview technique also facilitated the analysis of data by making responses easier to find and to compare, which allowed for greater ease in cross-case comparison and analysis. The interview questions were of the "experience", "opinion and value", and "knowledge" types (Patton, 2002).

The questions developed for the interview protocol were reviewed by an education faculty member at Montana State University who was experienced in interview design techniques and familiar with the purpose of this study and the setting where the interviews would take place. After several revisions, the questions were piloted by a group of parent volunteers who read the questions for clarity and reported back their opinions. Upon making revisions, which took their suggestions into consideration, the final list of questions was created. The complete list of interview questions and probes can be seen in Appendix E.

The interviews were scheduled during one week at a location that was convenient for the interviewees. Some interviews took place in the interviewee's homes, some at local restaurants, and some at my home. Each interview took between thirty and forty-five minutes. I offered snacks and drinks for each person who attended the interviews. Each interviewed family received a twenty-five dollar gift card for their participation.

Sampling Method. Interviews were conducted with a purposeful sample of students and family members to further clarify patterns found in the survey data, to explore more deeply reactions to the FAME program events, and to investigate barriers to participation in the program. Both adults and children were selected for interviews. A list of participants was created from the attendance data to establish a pool of potential interviewees.

In purposeful sampling, subjects are selected because they illustrate characteristics of particular subgroups of interest (Patton, 2002). The groups of interest in this study were participants who attended one or two events, three or four events, five or six events, or seven or more events.

The participants on the list were then coded by how many events they attended. Participants were coded in the following categories: 1) One or two events attended; 2) three or four events attended; 3) five or six events attended; or 4) seven or more events attended. Two participants from each category were randomly selected by numbering them and using a random number generator to choose two participants from each group.

Each of these randomly selected participants was sent a letter inviting them to participate in the interview process. In the first round, there were no responses to the



invitation to participate. Phone calls were then made to the random selection with no positive replies. Finally, while at an annual social gathering, five of the randomly selected participants agreed to be interviewed.

I believe the families who were originally contacted were not sure what the interview would be like and chose not to respond. Once I was able to speak to them in person, they could ask me questions and be assured they would be able to answer the questions. Out of the four categories above, one person from each category agreed to be interviewed plus one student who attended almost every event. Five of the interviewees were Native American and one was Caucasian.

#### Methods of Descriptive Data Analysis

Parent/Student Survey Analysis. Results from the *Parent Survey of Family and Community Involvement in the Elementary and Middle Grades* and the *Student Survey on Family and Community Involvement in the Elementary and Middle Grades* were analyzed to produce descriptive statistics for each item. The separate results of the parent and student surveys are reported as percentages and discussed in Chapter 4. Results are discussed by category as they appeared in the survey. Several categories are also disaggregated according to ethnicity subgroups to see if any interesting response patterns could be identified.

TIPS Homework Analysis. A record was kept of when each TIPS homework assignment was returned. The attached family partner evaluations were photocopied by the researcher, and then categorized first by grade level and then by assignment. Actual

homework was assessed by the classroom teachers. The evaluation consisted of three yes or no questions and one open-ended question that simply allowed space for “Any other comments.” The Yes or No responses for the first four questions were tallied and frequencies were obtained. A similar procedure was followed for the multiple-choice responses to the first part of the FAME evaluation form.

#### Methods of Narrative Data Analysis

The written FAME evaluation comments, the interview data, and the open-ended TIPS responses were all analyzed using qualitative techniques. Inductive analysis (Patton, 2002) was utilized to discover significant patterns, themes, and interrelationships from the open-ended responses. The approaches used to analyze all qualitative data are discussed in the following paragraphs.

Looking for Themes Within a Data Source. Using Bogdan and Biklin (1998) as a guide, I followed similar procedures for each data source. I first organized and ordered the data from a single source. For example, the statements collected from the interviews, FAME Math Evaluations, and TIPS were entered verbatim in an Excel spreadsheet so I could keep notes next to each statement. I then carefully read the responses a first time without making notes. Next, I reread each statement multiple times and recorded my thoughts about possible themes in the margins. These initial ideas (for example, “math is fun” or “my child does harder math than I did”) were then organized on a spreadsheet to make it easier to look for patterns that may emerge.

In the case of the FAME evaluations, the open-ended responses were read and reflective notes were made alongside the open-ended responses. Using the assistance of

word processing technology, the open-ended responses were then rearranged by grouping statements or parts of statements with the same or related themes. The collections of quotes were reduced into categories (Maxwell, 2005) that aided in capturing how FAME contributed to the participants' mathematical understanding.

Coding of the open-ended TIPS evaluation responses occurred once all of the TIPS data was collected. The open-ended questions were recorded and read the first time without any coding. During the second reading, main ideas from each response were written in the margin. These main ideas were then given codes. For example, next to the comment, "I think this a great way for families to get involved with what their kids are learning at school," I put the comment "Togetherness." Next to the statement, "He helped me remember what I learned again," I put the code "Refresher." Some codes were retained as the process continued, while others were combined or eliminated. The purpose of this analysis was to look for groups of comments that may be useful to the school and teachers to improve the interactive homework assignments.

Looking for Themes Across Data Sources. The themes or patterns developed from each data source were eventually compared against the other qualitative data sources to look for patterns among all of the data. In all, the interviews, post intervention evaluations, research notes, and TIPS evaluations were compared to look for patterns that were repeated across more than one data source. Themes from each data source were noted on a spreadsheet containing all the forms of qualitative data. These were constantly being rearranged by grouping the themes from one set of data with the themes found in another set until the most important findings from all data sources were included in the

spreadsheet. During this process, themes were eliminated and combined to find the most descriptive terms to provide a clear understanding of the parents' and students' perceptions of family involvement in mathematics (Patton, 2003).

For example, while reading the TIPS evaluations, a number of categories were developed: the work is difficult; doing work together is fun; parents commenting on their child's ability; general positive comments; and general negative comments. During the analysis of the FAME evaluations, other themes like "brings families together"; "thanks"; and "fun" were discovered, and – although most responses were brief – there was sometimes sufficient information to record the aspects of the program seen to contribute to togetherness, sense of fun or valuing of the program. Similarly, I identified a set of themes from the interview data; I then compared them to the themes found in the evaluation forms and TIPS evaluations. Finally, I compared these common themes against entries in my research notes to look for confirming evidence. While I was doing these comparisons, two university professors with expertise in curriculum and instruction and mathematics education looked for themes as well, from the interview data in particular. We compared our sets of themes and combined and deleted themes that were similar until we felt all of the main themes in the data were accounted for.

### Triangulation of Data

Triangulation is defined to be "a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study" (Creswell & Miller, 2000, p. 126). In this study, triangulation was applied primarily to the FAME evaluations and parent-student interviews, with support

from the researcher's observation and reflection journal. Patton (2002) advocates the use of triangulation by stating "triangulation strengthens a study by combining methods. This can mean using several kinds of methods or data, including using both quantitative and qualitative approaches" (p. 247).

Patton (2002) defines four types of triangulation: data, methods, investigator, and theory. In this study, both data and methods triangulation were used. Data triangulation involved comparing different sources of information (observations, interviews with parents and students, evaluation forms, and surveys). Triangulation of methods involved examining both quantitative and qualitative data. For example, qualitative data from the FAME evaluations was compared to the easily quantifiable data in the first section of the evaluation forms. Similarly the qualitative parent and student interview responses were compared to quantifiable portions of the survey data. Finally, there was a degree of investigator triangulation as three people (the researcher, a curriculum and instruction faculty member, and a mathematics education faculty member) compared and combined their findings after separately examining certain data sets.

#### Measures to Ensure Strength and Credibility of Data

The study's strength and credibility was partially addressed by the use of the mixed method design. Both qualitative and quantitative research methods have their advantages and disadvantages. Quantitative data collection through surveys allowed me to collect data from a large number of participants, both adults and students. Furthermore, quantitative methods can be replicated more easily by other researchers in investigating participants' perceptions of parent involvement in mathematics education. However, the

quantitative instruments primarily captured background information to determine how to develop the FAME program.

Qualitative methods, while using fewer subjects and producing findings that are more difficult to generalize, provided a richer description of the participants' perceptions. The multiple qualitative methods used in this study allowed for themes, attitudes, and perceptions to emerge that were unique to the FAME program and not identified in the literature. A mixed-methods approach allowed me to converge the quantitative and qualitative data (Creswell, 2009), which increased the internal validity of this study.

Specifically, triangulation was used to increase the validity of the findings and occurred in several ways (Patton, 2002). Data triangulation involved comparing findings from the various sources of data, including the surveys, the program evaluation, and the interview data. Triangulation involved investigating and understanding the research problem using quantitative and qualitative methods. In the study, data and methodological triangulation involved generating themes across and within the different sources of data.

Clear and detailed descriptions of the FAME program structure and its participants are provided. According to Lincoln and Guba (1985), the use of thick descriptions adds to verification which allows the reader to make decisions about transferability to other settings. The clear descriptions make the implementation process transparent and give insight on how to further develop a family math intervention program in a similar community. This detailed description of the FAME program design allows others to adequately judge the transferability of the findings.

### Family Math Intervention Implemented in this Study

Family math interventions included in this study were family math nights, math mini-courses, math workshops, and TIPS homework activities conducted with family partners. The interventions were offered to families concurrently with one family math night, four math mini-courses sessions, two math workshops, and one TIPS assignment per month. This section gives the reader an overview of each intervention with an example of one activity or agenda.

Family Math Nights. The focus of family math nights in many projects, including FAME, is to engage families in rich mathematics in an informal setting. A related goal of family math night (see chapter 2) is to strengthen students' mathematical aptitude through the "power" of family. The math nights are designed to engage family members so that they become role models of motivation, persistence, and competency during these sessions filled with mathematical thinking and communication (Taylor-Cox & Oberdorf, 2006). Needless to say, designing mathematical tasks that engage students and include constructive support roles appropriate for family members is a nontrivial challenge.

FAME family math nights were based on the mathematical strand students were currently working on in the classroom. September's theme was geometry; October's was number sense; November's was algebra; and December's was numbers and operations. Families were invited to attend via flyers given to all students. Family math nights were activity based with families free to move around to each activity as they were ready. Each family was able to take home a packet with all of the activities, directions and materials necessary to use the activities at home (see Figure 3).

Activity Name	Materials to Take Home
All Squared Up*: This activity encourages students to analyze characteristics and properties of two-dimensional shapes – specifically squares.	Directions, color tile paper, 30 color tiles
Party with Pentominoes*: This activity helps students develop richer understandings of how to apply transformations and symmetry to analyze geometrical situations.	Directions, color tile paper, color tiles, scissors, envelope, answer key
Nets Under Construction*: This activity provides students with the opportunity to identify and describe geometric solids and identify the shapes that make up the faces, bases and surfaces of the solid.	Directions, tag board, scissors, rulers, compass, clear tape
Newspaper Networks*: This activity enables students to enhance their skills of visualization and reasoning about spatial relationships.	Directions, newspaper networks map, counters, colored pencils, rulers
Pythagorean Triples*: This activity is a geometry activity in which students draw right triangles and create visual models of the Pythagorean theorem.	Directions, centimeter grid paper, centimeter cubes
Simple Symmetries**: This activity helps students develop an understanding of bilateral symmetry and a sense of geometric patterns.	Directions, colored paper, scissors, crayons, glue stick, magazines
Create a Puzzle**: This activity gives students the opportunity to explore attributes of geometric shapes by building and solving a sequenced series of puzzles.	Directions, scissors, tag board
Pentaspire Activity**: This activity helps students see congruent shapes and use a systematic approach for identifying characteristics of shapes.	Directions, pencil, 2 cm graph paper, scissors, color tiles
Cut-a-Card**: This activity gives students practice in visualizing an object in space and observing the effects of transformations on that shape.	Directions, Cut-a-Card puzzle, 3” x 5” index cards, scissors
Coordinates I**: This activity helps students learn the conventions of graphing points on the Cartesian plane.	Directions, first quadrant graph paper, pencil
Coordinates II**: This activity helps students become familiar with the four quadrants of the Cartesian graph.	Directions, four quadrant graph paper, pencil
Coordinate Tic Tac Toe**: This activity reinforces the skills of naming coordinates and graphing points on the Cartesian plane.	Directions, 10 x 10 grid paper, colored pencils
Hurkle**: This activity gives students the opportunity to practice naming points on the coordinate grid and using compass directions to find the hidden “Hurkle.”	Directions, Hurkle paper, colored pencils
Tangrams**: This activity develops an understanding of spatial relationships.	Directions, tangram set, tangram master sheet, tangram shape sheet
(*Taylor-Cox & Oberdorf, 2006; **Stenmark, Thompson & Cossey, 1986)	

Figure 3. Geometry Family Math Night Take-Home Packet



A typical family math night was planned for a two-hour block in the evening. As families arrived they were greeted and asked to sign in. They received a two-pocket folder with all of the activities in it and a gallon sized baggie for any materials they wanted to take home with them. They first went to the estimation activity.

An example of an estimation activity was to predict how many colored stones were in a jar. Each member of a family could make an estimation with the closest prediction winning a prize at the end of the evening.

After the family made their estimations they were free to roam around the activities and decide where they wanted to begin. There were enough activities available so families could spend as much time at an activity as they needed, and enough supplies and space for at least two families to do each activity. Cookies were provided by different families and juice was provided by the school. Towards the end of the evening the estimation winner was announced and door prizes were drawn. Before the two hours were up, families were asked to finish the activity they were working on and collect the supplies from activities they were unable to get to that evening. Packets from past events were set out with supplies for families who were unable to attend an activity but would like to do the activities.

Math Mini-Courses. The Math and Parent Partnerships in the Southwest (MAPPS) mini-courses (see chapter 2) were designed to provide professional development for parents (Civil, Bernier, & Quintos, 2003). Using the MAPPS materials, parents work on tasks similar to what is being seen in the classroom, while working in groups, sharing their ideas, using manipulatives and calculators, and applying other

strategies used in today's mathematics classrooms (Civil, Bernier, & Quintos, 2003).

MAPPS mini-courses contain eight two-hour classes on a main topic of K-8 mathematics.

The MAPPS mini-courses were designed to enhance the learning happening in the classroom. The September and October course was Geometry. The November and December course was Fractions, Decimals, and Percents. A course-long agenda (see Figure 4) was provided to each participant along with a binder of all the activities.

<b>Date</b>	<b>Content</b>	<b>Materials</b>
Session 1: September 8	Geometry with Tangrams and Paper	Tangrams, origami paper, patty paper
Session 2: September 15	Angles and Their Measurements	Pattern blocks, straws, paper clips, ruler, scissors, 30° wedges, 15° protractor, standard protractor, set of 30-60-90 and 45-45-90 construction triangles, 4 congruent quadrilaterals, calculator, colored pencils
Session 3: September 22	Area Measurement and Formulas	Ruler, scissors, calculator, glue stick, geoboard & rubber bands, chart paper, markers
Session 4: September 29	Volume and Geometric Representations of Operations	Patty paper, glue stick, base 10 block set, wooden cubes, color tiles, adding machine paper, 8.5"x11" paper, right triangle
Session 5: October 6	Circumference and Area of a Circle	Scissors, calculator, colored pencils, glue stick, adding machine paper, 8.5"x11" paper, safety compass, 8 meters of string, circular objects, tape, tape measure
Session 6: October 13	Pythagorean Theorem	Scissors, calculator, glue stick. Geoboard & rubber bands
Session 7: October 20	Symmetry	Patty paper, pattern blocks, scissors, Mira, hinged mirror, mirror
Session 8: October 27	Polyhedra	Origami paper, patty paper, scissors, tape, Polydron set, Polydron frames, protractor

*Figure 4. Geometry Course Agenda*

A plastic tote was provided for each participant to collect the manipulatives used in the course and items made in the course. The totes of materials and the binders were given to the participants for use at home and were theirs to keep at the end of the course.

A typical MAPPS mini-course session began with families signing in. As an example of a session, the first session of the geometry course was titled “Geometry with Tangrams and Paper.” The first fifteen minutes was spent with the opening activity in which the participants had the opportunity to solve tangram puzzles. They used right triangles, squares, and parallelograms to fill in given outlines and form shapes similar to given silhouettes of different animals. The next forty minutes was spent exploring systematically with tangram pieces to form squares and other shapes with a given number of pieces. The next thirty minutes was spent using right triangles of two sizes and a square to explore relations between their areas. The next twenty minutes was used to give participants the opportunity to explore properties of squares. The participants folded and overlapped patty paper to determine congruency of the different parts of the square. The last learning section was about ten minutes long and engaged participants in folding two smokestack ships using origami paper. The folds formed geometrical shapes and the participants could see the relationships between the sizes of the areas of different shapes. The last ten minutes were spent explaining the take-home activities in the participants’ binders and giving participants time to clean up and complete the evaluations.

Math Workshops. MAPPS Workshops for Parents (see chapter 2) focus on families and children learning specific mathematics topics together (Stenmark, Thompson, & Cossey, 1986). A typical workshop lasts one to two hours and gives

families opportunities to develop problem solving skills and build an understanding of mathematics with a hands-on approach (1986). Compared to the mini-courses, the workshops are one-time two hour blocks that focus on a small topic versus an entire mathematical strand. The aim is for families, regardless of their prior mathematics experiences, to engage and be successful in meaningful mathematics, and for parents to support and advocate for their children's mathematics education (Thompson & Mayfield-Ingram, 1998).

The FAME mathematics workshops were conducted twice a month using the same theme as the family math nights. The workshops were based on specific topics within the mathematical strands the students were working with in the classroom. The September workshops were Distance Around and Wrap It Up; October's were Garage Patterns and Styles in Tiles; November's were My Giant and Probability; and December's was Problem Solving. As with the other intervention events, the participants were given a folder with the agenda, workshop materials and the manipulatives used during the workshop (see Figure 5).

Teachers Involving Parents in Schoolwork (TIPS). Teachers have a responsibility to select or design homework assignments that are purposefully engaging and of high quality, so that all students, including low-ability students can take the time to complete the assignment and benefit from their efforts; and so that parents are appropriately and effectively involved in their children's education (Epstein & Van Voorhis, 2001). "Interactive homework" encourages students to share the things they are learning in school with family members, peers, or others in their community (Epstein & Van

Voorhis, 2001). Teachers Involve Parents in Schoolwork (TIPS) interactive homework assignments require students to talk to someone at home about something they are learning at school (Epstein, 2001).

<b>Activity</b>	<b>Overview</b>	<b>Timing</b>
Getting Started:	Introductions, objectives, materials	10 minutes
Setting the Stage	Make a net of a cube; define net, Which Net Makes a Cube? Activity, same or different activity	10 minutes
Nets of Cubes	How many nets of cubes can you make?, sharing out: cubes and not cubes	45 minutes
Processing	Characteristics of a cube concept map, everyday use of nets, careers that use nets	25 minutes
Connections	What mathematics were used, state and national standards	10 minutes
Take Home Applications	Instructions for take home activities and materials	10 minutes
Closing	Thank you, estimation prize, evaluations	10 minutes

*Figure 5. Wrap It Up Agenda*

TIPS homework assignments were given to students twice a month. The four math teachers, along with myself, created these assignments based on what was being learned in the 6<sup>th</sup>-8<sup>th</sup> grade classrooms and used them as a communication tool between school and home. These assignments provided the student and a family member with a structured time to talk about mathematics at home. Interactive homework were assigned and graded just like a regular homework assignment with a few differences in activity format (see Appendix H).

A TIPS math assignment was a two-sided paper divided into six sections:

- *Look This Over* shows an example of a skill that was taught in class, and allows the student to explain the skill to a family partner. The answer to the example is given.
- *Now Try This* presents another example for the student to demonstrate how to do the particular skill. The answer to this problem is on the back of the page.
- *Practice and More Practice* provides regular homework problems for the student to practice for mastery. The answers are not given to these problems.
- *Let's Find Out* or *In the Real World* is a problem designed to help the student and family partner discover and discuss how the math skill is used at home or in a common situation.
- *Home-to-School Communication* invites the family partner to record an observation, comment, or question for the mathematics teacher about the demonstrated skill.
- *Family Partner Signature* is requested on each activity.

Each assignment was designed for the student to demonstrate what was being learned in the classroom. Lastly, the family partner for a particular assignment was asked to complete a short evaluation of the student's understanding and to sign the assignment.

The assignments were graded and recorded by the teachers. The family partner evaluation information was recorded by the researcher.

### Researcher Background and Roles in the Study

I have lived and worked in this community for fourteen years. I first worked for two years at a mission school south of the community. Here my family was adopted into the tribe by a family who worked at the school. I took a mathematics position in town and worked at the middle school teaching seventh and eighth grade mathematics for twelve years. In that time, I served as a mathematics curriculum committee member and chairperson; provided mathematics professional development in the district and in the surrounding area's districts; and at the state level, volunteered to assist on state tests and new mathematics standards.

In this study, I was the researcher, the program coordinator, and lead facilitator for FAME. I researched appropriate family mathematics programs and designed the FAME program for this community and collected and analyzed the data gathered in the study. I coordinated the calendar, facilities, materials, and advertising for the program. I was also the lead facilitator for each of the components within the FAME program. My school district granted me a half-time unpaid leave during 2008-2009 to carry out this research. Although the district was broadly supportive of FAME, they were not in a position to grant leave time during its implementation. During this period, I received tuition and some fellowship support from a federal grant awarded to my university.

### Summary

This chapter provided a description of the context for the study, the community of participants, and the researcher's role in that community. The components of the FAME family math intervention were also described in detail. Methods of data collection and the

sample used for each form of data collection were discussed. Finally, the overall approach to qualitative data analysis was presented, as well as a discussion of types of triangulation of data used in this study. More detailed descriptions of the qualitative analysis applied to each data source can be found in Chapter 4.

This study utilized multiple sources and methods of data collection (see Figure 1) to describe the implementation process and investigate the effectiveness of a family mathematics intervention program at a middle school.

First, two surveys (see Appendices A and C), developed by the Center on School, Family, and Community Partnerships at Johns Hopkins University were given to all families and students in the middle school. The purpose of the surveys was to determine how students and families perceive the family's role in supporting mathematics learning. Second, while implementing the FAME program components, data were collected from family participants and coupled with researcher observations to determine if changes needed to be made within the program and if so what changes. Third, participant interviews were conducted to further clarify patterns found in the survey data, to explore more deeply reactions to the FAME program events, and to investigate barriers to participation in the program.



## CHAPTER 4

### RESULTS

This chapter presents the results of the analysis of data collected by the various research methods described in the previous chapter. The format for discussion of the data collection and analysis procedures and findings will follow a format similar to Chapter 3, with the results presented and discussed in this order: Parent Survey data; Student Survey data; Family Math Night evaluations; research journal data; TIPS homework assignment data; and interview data.

A brief introduction is given at the beginning of each section, followed by a presentation of data and discussion of relevant findings with a brief summary of results obtained from that particular source of data. Lastly, the results from the various data sources are tied together to help answer the major questions of the study, repeated below.

1. *Prior to involvement in FAME, how do students and families perceive the families' role in mathematics education?*
2. *How does the process of implementing the FAME program evolve over time?*
  - a. *What barriers and unexpected issues arise?*
  - b. *What adaptations become necessary, and why?*
  - c. *What features of the program are most effective?*
3. *How do families respond to and participate in the FAME program?*

#### Parent Survey Results

The Parent Survey was sent out to all families with children in the school examined in this study. One hundred ninety-two families, about 58 percent, returned the

surveys to the school. The results of the survey were summarized by topic and described below. The Cronbach's alpha was given and a table was displayed when the results were applicable. Cronbach's alpha is a measure of internal consistency or how closely related a set of items are as a group. A brief discussion of some of the interesting results concludes each section. All percents are rounded to the nearest whole number.

#### “Your Family” - Demographic Information

Mothers made up 78 percent of the respondents to the survey; just over 8 percent were fathers and about the same proportion were grandparents. Native American respondents made up 59 percent of the sample, which is less than the 70+ percent make-up of the school. Out of the households that responded, 36 percent were bilingual with English as the first language while the rest spoke only English. Of the respondents, 90 percent graduated from high school and 48 percent graduated from college or a vocational/technical school. Eighty percent of the parents stated a belief that their children would graduate from a college or a vocational/technical school.

#### “The School's Contact with You”

Parents were asked to assess the school's performance in inviting parents to be involved at school; communicating about children's progress; and encouraging parent-child interactions on homework. For each statement, the survey asked parents to choose from among four responses: Well (1), OK (2), Poorly (3), or Never (4). Table 1 displays the parents' responses to each statement, while Table 2 displays comparison data for American Indian and Caucasian parent responses to each statement.

Table 1: Responses to the “School’s Contact with You” Questions, (N=192,  $\alpha = .771$ ).

My child’s teacher or someone at the school...	M	SD	Well (1)	OK (2)	Poorly (3)	Never (4)	N/ A
Tells me how my child is doing in school	1.61	0.87	42%	40%	8%	4%	6%
Explains how to check my child’s homework	2.18	1.22	26%	33%	14%	21%	6%
Tells me what skills my child needs to learn in mathematics	2.39	1.80	30%	42%	14%	9%	5%
Assigns homework that requires my child to talk with me about things learned in class	2.06	1.03	20%	44%	20%	10%	6%
Has a parent-teacher conference with me	1.46	0.82	52%	34%	4%	4%	6%
Asks me to volunteer at school	2.59	1.20	12%	36%	14%	33%	5%

To assess whether the six items that were summed to create the “School’s Contact with You” score formed a reliable scale, Cronbach’s alpha was computed. The alpha for the six items was .77, which indicates that the items form a scale that has modest internal consistency reliability. Similarly, the alpha for the American Indian parent responses (.87) and the alpha for the Caucasian parent responses (.84) indicated acceptable internal consistency.

Overall, parents positively rated the school to home contact for each statement. One statement, “Asks me to volunteer,” was not as highly rated (48 percent). The most common school contact was reported to be “has a parent-teacher conference with me” which was reported as Well or OK by eighty-six percent of the parents. The Caucasian parents consistently reported fewer positive responses in the school to home contact section than the American Indian parents, except for the statement, “Asks me to volunteer.”

Table 2: Comparison of American Indian and Caucasian Responses to the “School’s Contact with You” Questions

My child’s teacher or someone at the school...	M	SD	Well (1)	OK (2)	Poorly (3)	Never (4)	N/A
<b>American Indian Responses (N=112, <math>\alpha = .866</math>)</b>							
Tells me how my child is doing in school	1.69	0.91	40%	40%	9%	6%	5%
Explains how to check my child’s homework	2.14	1.15	27%	38%	11%	20%	4%
Tells me what skills my child needs to learn in mathematics	2.18	1.58	34%	43%	12%	7%	4%
Assigns homework that requires my child to talk with me about things learned in class	2.06	1.02	20%	45%	19%	10%	6%
Has a parent-teacher conference with me	1.55	0.80	44%	43%	4%	4%	5%
Asks me to volunteer at school	2.78	1.16	10%	35%	12%	40%	3%
<b>Caucasian (N=64, <math>\alpha = .839</math>)</b>							
Tells me how my child is doing in school	1.44	0.79	45%	39%	5%	2%	9%
Explains how to check my child’s homework	2.19	1.31	22%	27%	19%	22%	10%
Tells me what skills my child needs to learn in mathematics	2.84	2.20	22%	41%	16%	12%	9%
Assigns homework that requires my child to talk with me about things learned in class	1.97	1.07	22%	39%	22%	8%	9%
Has a parent-teacher conference with me	1.25	0.82	63%	20%	3%	3%	11%
Asks me to volunteer at school	2.31	1.25	14%	36%	17%	24%	9%

### School Climate

Parents were asked to rate the extent to which they believe their child attends a good school that welcomes and cares for parents and children. Response choices were: Strongly Agree (1), Agree (2), Disagree (3), and Strongly Disagree (4). Eighty-three percent of the parents agreed or strongly agreed that their child was in a good school. Feeling welcome in the school was viewed positively by 82 percent of the parents, and 87 percent felt they get along well with their child’s teacher(s). Finally, 79 percent of the parents confirmed that teachers at this school care about their child.

“Your Involvement” – Parent Involvement.

Parents reported the frequency with which they engage in their child’s education in various ways, either at home or at school. The scale to choose from was Everyday or Most Days (1), Once a Week (2), Once in a While (3), or Never (4). Table 3 displays the parent’s responses to each statement. Table 4 displays comparative data for American Indian and Caucasian parent responses.

Table 3: Responses to “Your Involvement” - Parent Involvement Questions, (N=192,  $\alpha = .757$ ).

How often do you do the following activities?	M	SD	Most Days (1)	Once a Week (2)	Once in a While (3)	Never (4)	N/A
Review and discuss schoolwork your child brings home	1.52	0.79	61%	24%	12%	2%	1%
Ask your child how he/she is doing in school	1.82	0.84	38%	39%	18%	3%	2%
Check to see if your child finished his/her homework	1.39	0.68	70%	21%	7%	1%	1%
Help your child with math	2.02	0.92	32%	35%	27%	5%	1%
Ask your child what he/she is learning in math	1.77	0.79	42%	36%	21%	0%	1%
Help your child prepare for math tests	2.19	1.02	27%	30%	31%	10%	2%
Talk to your child’s teacher	2.66	0.75	7%	21%	65%	5%	2%
Visit your child’s school	2.67	0.73	7%	22%	64%	6%	1%
Volunteer in the classroom or at school	3.38	0.85	2%	5%	37%	54%	2%

Cronbach’s alpha was calculated to assess whether the nine items creating the “Your Involvement” score formed a reliable scale. The alpha for the nine items was .76, which indicates that the items form a scale that has modest internal consistency reliability.

The alpha for the American Indian responses was .77 and the alpha for the Caucasian

Table 4: Comparison of American Indian and Caucasian Responses to “Your Involvement” - Parent Involvement Questions.

How often do you do the following activities?	M	SD	Most Days (1)	Once/Week (2)	Once/While (3)	Never (4)	N/A
<b>American Indian (N=112, <math>\alpha = .77</math>)</b>							
Review and discuss schoolwork your child brings home	1.54	0.83	62%	21%	13%	3%	1%
Ask your child how he/she is doing in school	1.32	0.57	70%	24%	5%	0%	1%
Check to see if your child finished his/her homework	1.46	0.75	65%	23%	9%	2%	1%
Help your child with math	1.98	0.93	34%	33%	27%	5%	1%
Ask your child what he/she is learning in math	1.79	0.84	41%	39%	15%	4%	1%
Help your child prepare for math tests	2.16	1.07	29%	32%	23%	13%	3%
Talk to your child’s teacher	2.60	0.82	10%	21%	61%	6%	2%
Visit your child’s school	2.62	0.77	9%	24%	60%	6%	1%
Volunteer in the classroom or at school	3.40	0.84	3%	4%	36%	55%	2%
<b>Caucasian (n = 64, <math>\alpha = .80</math>)</b>							
Review and discuss schoolwork your child brings home	1.48	0.71	59%	28%	11%	0%	2%
Ask your child how he/she is doing in school	1.28	0.55	77%	19%	5%	0%	0%
Check to see if your child finished his/her homework	1.30	0.58	77%	17%	6%	0%	0%
Help your child with math	1.84	0.86	45%	25%	30%	0%	0%
Ask your child what he/she is learning in math	1.73	0.80	39%	39%	19%	0%	3%
Help your child prepare for math tests	2.28	0.98	22%	25%	44%	6%	3%
Talk to your child’s teacher	2.77	0.64	2%	20%	72%	4%	2%
Visit your child’s school	2.73	0.70	5%	17%	72%	5%	1%
Volunteer in the classroom or at school	3.34	0.91	2%	6%	36%	53%	3%

response was .80, both indicating approaching acceptable internal consistency.

Grouping some of the responses suggests that about 90 percent of parents felt they engage in school-related activities at home with their children but only 75 percent stated

that they specifically do math-related activities at home. It's noteworthy that although 82 percent of the parents reported feeling welcomed at the school in the school climate section, only about 30 percent reported regularly visiting the school or talking with their child's teacher. The differences in the percents may be due to the parent's perception of what visiting the school means or talking with the child's teacher means. If parents do not see parent-teacher conferences as visiting the school, for example, the parents may factor their conference experience into their survey response as a welcoming experience, but not as a visiting experience.

#### "Your Ideas" - Perceived Parental Role

Parent responses in this section revealed parents' beliefs about how they should be involved in their children's education and schooling. Parents were asked to respond by choosing Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4). Table 5 displays the parents' responses to the perceived parental role statements. Table 6 displays comparative data for American Indian and Caucasian parent responses.

To assess whether the nine items used to create the "Your Ideas" score formed a reliable scale, Cronbach's alpha was computed. The alpha for the nine items was .90 which may mean that the items were repetitious or there are more items in the scale than are really necessary for an internally reliable measure of this concept.

More than 90% of American Indian and Caucasian parents chose either "Strongly agree" or "Agree" when evaluating whether each of the behaviors above was a parent's responsibility. However, a closer look at the data shows some noteworthy differences in the responses of the two groups of parents.

Table 5: Responses to “Your Ideas” - Perceived Parental Role Questions, (N=192,  $\alpha = .897$ ).

It is a parent’s responsibility to ....	M	SD	Strongly Agree (1)	Agree (2)	Dis- agree (3)	Strongly Disagree (4)	N/ A
Make sure that their child learns at school	1.52	0.79	70%	26%	2%	1%	1%
Teach their child to value schoolwork	1.82	0.84	75%	22%	1%	1%	1%
Contact the teacher as soon as academic problems arise	1.39	0.68	30%	61%	3%	1%	5%
Test their child on subjects taught in school	2.02	0.92	28%	52%	16%	2%	2%
Keep track of their child’s progress in school	1.77	0.79	64%	32%	2%	1%	1%
Contact the teacher if they think their child is struggling in school	2.19	1.02	70%	27%	1%	1%	1%
Show an interest in their child’s schoolwork	2.66	0.75	79%	19%	0%	1%	1%
Help their child understand homework	2.67	0.73	71%	25%	2%	1%	1%
Know if their child is having trouble in school	3.38	0.85	76%	21%	1%	1%	1%

For example, within the positive response categories of “Strongly Agree” and “Agree,” Caucasian parents’ responses were skewed further toward “Strongly Agree,” by an 8 – 11% margin, compared to American Indian parents’ responses for items pertaining to (1) making sure their child learns at school; (2) teaching their child to value school work; (3) contacting the teacher as soon as academic problems arise; and (4) keeping track of their child’s progress in school.

A higher proportion of American Indian parents than Caucasian parents chose “Strongly Agree” for items pertaining to (1) testing their child on subjects taught in school (33 vs. 17%); and (2) helping their child with homework (73 vs. 64%). Of all the types of parent involvement presented in Table 6, the lowest ratings were assigned the



Table 6: Comparison of American Indian and Caucasian Parents' Responses to "Your Ideas" - Perceived Parental Role Questions, (N=112,  $\alpha = .919$ ).

It is a parent's responsibility to ....	M	SD	Strongly Agree (1)	Agree (2)	Dis- agree (3)	Strongly Disagree (4)	N/ A
<b>American Indian (N=112, <math>\alpha = .92</math>)</b>							
Make sure that their child learns at school	1.36	0.55	67%	31%	1%	1%	0%
Teach their child to value schoolwork	1.29	0.53	73%	25%	1%	1%	0%
Contact the teacher as soon as academic problems arise	1.70	0.71	27%	63%	3%	2%	5%
Test their child on subjects taught in school	1.78	0.77	33%	50%	13%	2%	2%
Keep track of their child's progress in school	1.43	0.58	61%	36%	2%	1%	0%
Contact the teacher if they think their child is struggling in school	1.33	0.56	70%	27%	2%	1%	0%
Show an interest in their child's schoolwork	1.24	0.49	78%	21%	0%	1%	0%
Help their child understand homework	1.29	0.53	73%	25%	1%	1%	0%
Know if their child is having trouble in school	1.26	0.52	77%	21%	1%	1%	0%
<b>Caucasian (N=64, <math>\alpha = .89</math>)</b>							
Make sure that their child learns at school	1.27	0.57	75%	19%	5%	0%	1%
Teach their child to value schoolwork	1.17	0.42	80%	19%	0%	0%	1%
Contact the teacher as soon as academic problems arise	1.63	0.58	38%	58%	3%	0%	1%
Test their child on subjects taught in school	1.98	0.72	17%	58%	22%	0%	3%
Keep track of their child's progress in school	1.31	0.56	69%	27%	3%	0%	1%
Contact the teacher if they think their child is struggling in school	1.23	0.50	70%	27%	0%	0%	3%
Show an interest in their child's schoolwork	1.14	0.39	83%	16%	0%	0%	1%
Help their child understand homework	1.39	0.63	64%	28%	6%	0%	2%
Know if their child is having trouble in school	1.20	0.51	75%	20%	2%	0%	3%

item regarding parents' responsibility to test their child on school subjects. Yet even for this item an impressive 88% of American Indian parents and 75% of Caucasian parents chose "Strongly Agree" or "Agree."

### Student Survey Results

The Student Survey was given to the 186 students who had parental permission to take the survey. Students were given the survey at school at the beginning of the school year. The results of the survey were presented according to the subsections of the survey as they appeared on the survey. The Cronbach's alpha was given and a table was displayed where applicable. A brief discussion of the findings was given at the end of each section.

#### "About You and Your Family"

Native American students made up 63 percent of the respondents to the student survey, which is a reasonable representation of the 70 percent Native American students who make up the school population. Out of the students who responded, 52 percent speak English only at home with 14 percent speaking a mix of English and Crow. The other 34 percent of the students speak only Crow; only Northern Cheyenne; a mix of Northern Cheyenne and English; only Spanish; or a mix of Spanish and English. Forty-two percent of the students felt they would graduate from a college or a vocational/technical school.

#### "Your Ideas"

Students reported on how confident they are in their abilities to learn and succeed

in school as well as their sense of belonging – their feeling of being included, accepted, and valued at school (Sheldon & Epstein, 2007). Students were asked to choose to what degree they agreed or disagreed with the statements: Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4). Table 7 displays the percentage of students who responded to each statement. Table 8 displays comparative data for American Indian and Caucasian students.

Table 7. Responses to “Your Ideas” Questions, (N=120,  $\alpha = .419$ ).

How much do you agree or disagree with the following statements?	M	SD	Strongly Agree (1)	Agree (2)	Dis-agree (3)	Strongly Disagree (4)	N/A
I am good at my schoolwork	2.04	0.59	15%	66%	19%	0%	0%
There is someone at this school I can talk to if I have a problem	1.98	0.80	29%	49%	18%	4%	0%
I remember things easily	2.23	0.58	7%	64%	28%	1%	0%
People at this school are friendly to me	2.01	0.80	24%	56%	14%	6%	0%
I am just as smart as other kids my age	2.02	0.77	25%	52%	20%	3%	0%
I feel like a part of this school	1.93	0.83	27%	54%	12%	6%	1%
I can do the work in my classes	1.84	0.67	28%	58%	12%	1%	1%
Sometimes I feel like I don't belong at this school	2.78	0.94	10%	22%	45%	22%	1%
We do many things in school that I can do well	2.04	0.67	17%	66%	14%	3%	0%
I wish I were in a different school	3.03	0.98	8%	11%	43%	36%	2%

To assess whether the ten items that were summed to create the “Your Ideas” score formed a reliable scale, Cronbach’s alpha was computed. The alpha for the ten items was .42, which indicates that the items form a scale that has minimal internal consistency reliability.

Table 8. Comparison of American Indian and Caucasian Responses to “Your Ideas” Questions, (N=76,  $\alpha = .521$ ).

How much do you agree or disagree with the following statements?	M	SD	Strongly Agree (1)	Agree (2)	Dis-agree (3)	Strongly Disagree (4)	N/A
<b>American Indian (N=76, <math>\alpha = .521</math>)</b>							
I am good at my schoolwork	2.07	0.58	13%	66%	21%	0%	0%
There is someone at this school I can talk to if I have a problem	2.03	0.82	28%	46%	22%	4%	0%
I remember things easily	2.25	0.57	7%	62%	31%	0%	0%
People at this school are friendly to me	2.05	0.71	18%	62%	16%	4%	0%
I am just as smart as other kids my age	2.07	0.79	22%	54%	19%	5%	0%
I feel like a part of this school	1.86	0.71	28%	57%	13%	1%	1%
I can do the work in my classes	1.86	0.67	26%	58%	15%	0%	1%
Sometimes I feel like I don't belong at this school	2.95	0.88	4%	21%	46%	28%	1%
We do many things in school that I can do well	1.96	0.58	18%	67%	15%	0%	0%
I wish I were in a different school	3.16	0.90	4%	13%	41%	41%	1%
<b>Caucasian (N=25, <math>\alpha = .609</math>)</b>							
I am good at my schoolwork	1.96	0.61	20%	64%	16%	0%	0%
There is someone at this school I can talk to if I have a problem	1.80	0.76	36%	52%	8%	4%	0%
I remember things easily	2.32	0.63	4%	64%	28%	4%	0%
People at this school are friendly to me	2.24	0.97	20%	52%	12%	16%	0%
I am just as smart as other kids my age	1.92	0.76	32%	44%	24%	0%	0%
I feel like a part of this school	1.93	0.83	20%	48%	16%	12%	4%
I can do the work in my classes	1.84	0.67	32%	56%	8%	4%	0%
Sometimes I feel like I don't belong at this school	2.78	0.94	28%	36%	32%	4%	0%
We do many things in school that I can do well	2.04	0.67	8%	84%	8%	0%	0%
I wish I were in a different school	3.03	0.98	20%	8%	48%	20%	4%

Similarly, the American Indian responses alpha (.52) and the Caucasian response alpha (.61) indicated a scale that has minimally adequate reliability.

Most items in the “Your Ideas” scale were rated “Strongly Agree” or “Agree” by about eighty percent of the students. Only nineteen percent of the students rated “I wish I were in a different school” as “Strongly Agree” or “Agree.” A higher percentage of Caucasian students (28 percent) responded “Strongly Agree” or “Agree” to the statement than American Indian students (17 percent).

Caucasian students were much more likely to select “Strongly Agree” for “Sometimes I feel like I don’t belong at this school,” and “I wish I were in a different school,” and less likely to choose “Strongly agree” for “We do many things in school that I can do well.” American Indian students were less likely to choose “Strongly Agree” for “Sometimes I feel like I don’t belong at this school” and more likely to choose “Strongly Agree” or “Agree” for “I feel like part of this school.”

#### “You and Your Family”

Students were asked to what extent they agree or disagree with statements about parent involvement and interactions related to school. They again had option of Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4). Seventy-seven percent of the students responded that they enjoy having a parent help them with schoolwork, while 65 percent of students said they like to talk with a parent about school. Out of the respondents, 41 percent like having homework that asks them to talk with someone at home.

### Parent Involvement

Students reported the frequency with which a parent engages in their schooling in different ways. The scale to choose from was Everyday/ Most Days (1), Once a Week (2), Once in a While (3), or Never (4). Table 9 displays the percentages of students who responded to each statement. Table 10 displays comparative data for American Indian and Caucasian student responses.

Table 9. Responses to Parent Involvement Questions, (N=120,  $\alpha = .861$ ).

How often do your parents do the following activities?	M	SD	Most Days (1)	Once a Week (2)	Once in a While (3)	Never (4)	N/A
Review or discuss the schoolwork you bring home	2.16	1.05	37%	21%	31%	11%	0%
Help you with math homework	2.03	1.08	44%	16%	29%	10%	1%
Ask you about what you are learning in math	2.16	1.03	30%	25%	34%	8%	3%
Help you with math homework	2.11	1.08	38%	23%	26%	12%	1%
Help you understand what you are learning in math	2.18	1.09	34%	27%	23%	15%	1%
Help you prepare for math tests	2.60	1.10	22%	18%	35%	24%	1%
Ask you how well you are doing in school	1.62	0.93	58%	18%	18%	3%	3%
Make sure all of your homework is done	1.59	0.91	66%	13%	17%	4%	0%
Volunteer in the classroom or at your school	3.24	0.94	6%	8%	37%	48%	1%
Visit your school	3.07	0.75	7%	5%	63%	25%	0%

Cronbach's alpha was calculated to assess if the ten items formed a reliable scale.

The alpha for the ten items was .86 indicating that the items form a scale that has reasonable internal consistency reliability. Similarly, the alpha for the American Indian responses (.87) and Caucasian responses (.84) indicated good internal consistency.

Table 10. Comparison of American Indian and Caucasian Responses to Parent Involvement Questions.

How often do your parents do the following activities?	M	SD	Most Days (1)	Once a Week (2)	Once in a While (3)	Never (4)	N/A
<b>American Indian (N=76, <math>\alpha = .872</math>)</b>							
Review or discuss the schoolwork you bring home	2.17	1.02	36%	21%	34%	9%	0%
Help you with math homework	2.09	1.09	41%	15%	34%	9%	1%
Ask you about what you are learning in math	2.16	1.11	32%	20%	34%	10%	4%
Help you with math homework	2.17	1.09	34%	24%	28%	13%	1%
Help you understand what you are learning in math	2.18	1.12	33%	29%	20%	17%	1%
Help you prepare for math tests	2.54	1.17	25%	19%	29%	26%	1%
Ask you how well you are doing in school	1.61	0.92	59%	16%	19%	3%	3%
Make sure all of your homework is done	1.62	0.92	65%	13%	18%	4%	0%
Volunteer in the classroom or at your school	3.30	0.88	4%	8%	37%	50%	1%
Visit your school	3.08	0.74	5%	8%	61%	26%	0%
<b>Caucasian (N=25, <math>\alpha = .844</math>)</b>							
Review or discuss the schoolwork you bring home	2.04	1.10	44%	20%	24%	12%	0%
Help you with math homework	2.08	1.08	44%	12%	36%	8%	0%
Ask you about what you are learning in math	2.12	0.88	28%	36%	32%	4%	0%
Help you with math homework	2.08	1.12	44%	16%	28%	12%	0%
Help you understand what you are learning in math	2.12	1.05	40%	16%	36%	8%	0%
Help you prepare for math tests	2.68	0.99	16%	20%	44%	20%	0%
Ask you how well you are doing in school	1.60	0.87	60%	24%	12%	4%	0%
Make sure all of your homework is done	1.56	0.92	68%	12%	16%	4%	0%
Volunteer in the classroom or at your school	3.04	1.17	12%	4%	36%	44%	4%
Visit your school	3.04	0.73	8%	0%	72%	20%	0%

Students marked “Most Days” or “Once a Week” on most of the items in the parent involvement section. Very few students marked “Most Days” or “Once a Week” on the statements “Volunteer in the classroom or at your school” (14 percent) and “Visit your school” (12 percent).

Although there is no way to ensure that the students of the parents who completed the survey are the same students who completed the survey, it is interesting to note that seventy percent of the parents stated they help their children with their math homework while 61 percent of the students reported receiving help from their parents, suggesting that perceptions are similar between students and parents in this area.

In contrast, 77 percent of the parents reported they ask their children what they are learning in math, yet only 55 percent of the students reported their parents ask them what they are learning in math. Ninety-one percent of the parents reported they check to make sure their child’s homework is done, but only 79 percent of the students reported their parents check to see if their homework is finished.

A noticeably higher proportion of Caucasian students than American Indian students stated that their parents review or discuss the schoolwork you bring home and help you understand what you are learning in math on most days. However, a higher percentage of American Indian students reported that their parents regularly helped them prepare for math tests. This is an intriguing result that is not easily explained, even by those of us who have worked closely with the students and parents in this school and community for years.



“Your School and Family”

Students reported the extent to which the school and/or teachers have a relationship with their parents, and whether teachers assign work that requires students to interact with their parents. Students were asked to respond by choosing Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4). The numbers of respondents who chose each response are displayed in Table 11. Comparison data of American Indian and Caucasian responses are shown in Table 12.

Table 11. Responses to “Your School and Family” Questions, (N=120,  $\alpha = .754$ )

How much do you agree or disagree with the following statements?	M	SD	Strongly Agree (1)	Agree (2)	Disagree (3)	Strongly Disagree (4)	N/A
The school is friendly to my parent	1.78	0.70	32%	61%	2%	4%	1%
My parent talks with my teachers by phone or at school	2.27	0.79	12%	52%	29%	6%	1%
My math teacher gives homework that requires me to talk with a parent	2.13	0.81	18%	53%	22%	6%	1%
My parent feels welcome at this school	1.88	0.74	28%	59%	8%	4%	1%
My teachers know my parent	2.13	0.86	21%	51%	20%	7%	1%

To assess if the five items that created the “Your School and Family” score formed a reliable scale, Cronbach’s alpha was computed. The alpha for the five items was .75, which indicates that the items form a scale that has modest internal consistency reliability. Similarly, the alpha for American Indian responses (.77) and Caucasian responses (.83) indicated good internal consistency.

Overall, students rated the relationship between school and home as positive (“Strongly Agree” or “Agree”). Interesting to note is more Caucasian students (80

Table 12. Comparison of American Indian and Caucasian Responses to “Your School and Family” Questions, (N=76,  $\alpha = .773$ )

How much do you agree or disagree with the following statements?	M	SD	Strongly Agree (1)	Agree (2)	Dis-agree (3)	Strongly Disagree (4)	N/A
<b>American Indian (N=76, <math>\alpha = .773</math>)</b>							
The school is friendly to my parent	1.74	0.66	31%	62%	3%	3%	1%
My parent talks with my teachers by phone or at school	2.24	0.80	15%	47%	33%	4%	1%
My math teacher gives homework that requires me to talk with a parent	2.11	0.86	21%	50%	21%	7%	1%
My parent feels welcome at this school	1.82	0.69	28%	62%	7%	2%	1%
My teachers know my parent	2.24	0.85	16%	47%	29%	7%	1%
<b>Caucasian (N=25, <math>\alpha = .826</math>)</b>							
The school is friendly to my parent	1.92	0.81	28%	60%	4%	8%	0%
My parent talks with my teachers by phone or at school	2.44	0.87	8%	56%	20%	16%	0%
My math teacher gives homework that requires me to talk with a parent	2.12	0.73	16%	60%	20%	4%	0%
My parent feels welcome at this school	1.96	0.84	28%	56%	8%	8%	0%
My teachers know my parent	2.00	0.96	32%	48%	8%	12%	0%

percent) marked “My teachers know my parent” than the American Indian students (63 percent). Yet American Indian students were more likely to “Strongly Agree” that “My parent talks with my teachers by phone or at school” (15%), compared to Caucasian students (8%), and the mean scores for this item reflected the more positive responses of the American Indian students compared to Caucasian students (2.24 vs. 2.44 with lower scores preferable). There is no obvious explanation for these particular response differences, even for those of us with long term involvement in this school and community.

### FAME Math Event Overview

Fourteen FAME math events were offered during the fall semester of 2008. These included an eight-session geometry mini-course; three mathematics workshops, and three Family Math Nights.

The September FAME math events included a “Geometry” Family Math Night and the first three geometry mini-course sessions; the “Distance Around” workshop; and the “Wrapping It Up” workshop. October FAME math events included a “Numbers I” Family Math Night; the “Garage Patterns” workshop; and geometry mini-course sessions four through six. The November math events included a “Numbers II” Family Math Night and the final two geometry mini-course sessions. The December events included a “Math Games” Family Math Night and the FAME celebration.

The fourteen FAME events had a total of one hundred forty (140) attendees across all events. A total of sixty students and fifty-four adults signed in for the events; the remaining attendees did not sign in, but were counted (see Table 13).

The sixty student sign-ins consisted of thirty individual students, many who attended more than once. The fifty-four adult sign-ins consisted of twenty-five individual adults, many who attended more than once.

### Family Math Night Evaluation Data

The FAME program Family Math Evaluations consisted of four check-off questions which measured the usefulness of the information covered at the event and the organization of the event. The questions were chosen to reflect what components of the program could be changed to meet the needs of the participants.

Table 13. FAME Attendance

FAME Event	Number of Attendees
Geometry mini-course #1	14
Geometry mini-course #2	15
Geometry mini-course #3	9
Geometry mini-course #4	9
Geometry mini-course #5	4
Geometry mini-course #6	4
Geometry mini-course #7	7
Geometry mini-course #8	2
“Distance Around” workshop	3
“Wrap it Up” workshop	6
“Garage Patterns” workshop	6
Geometry math night	15
Numbers math night #1	16
Numbers math night #2/Celebration	30

Thirty-five evaluations were completed and recorded. Out of the thirty-five evaluations, 100% indicated that the session was very worthwhile; the session was well organized; and the session lasted just about the right amount of time.

The participants also responded to two open-ended questions asking them to describe the mathematics they learned that night and to provide comments that may help improve the FAME program. Many participants listed one or two math ideas that were related to the objective of the Family Math Night. For example, when we were

investigating area and perimeter one participant said she could now “find the area of a parallelogram by transforming it into a rectangle, and then find the area of the rectangle.”

Following one Family Math Night a participating family said, “We learned that we can have fun doing math problems.” Members of another family shared individual ideas:

Mother: “Math can be fun! Shouldn't be so stressful.”

Daughter: “Sometimes it could be fun and kind of hard.”

Son: “I can use the shapes for different types of fractions.”

While learning how mathematics is related to the packaging industry, one participant said she learned the criteria to form a cube and what a tessellation is. Commenting on an activity about the tire industry and its relationship to circles, participants asked for “More about pi and tires!”

After a lesson that involved building large polyhedra one participant said, “Time went fast. [The] icosahedron - 20 sided - was interesting. I enjoyed doing these projects with my daughters, thank you very much.” One of the student participants said, “I [learned] to build an icosahedron together from sticks. This [was] very fun.” A second student said, “I learned to build and make [a] icosahedra together from sticks. Thank you very much. I had much fun here.”

After learning about the Pythagorean Theorem one participant said, “I re-learned the Pythagorean Theorem and its application - it had been a long time! It's really handy to know how to find the length of a line (the unknown side of a triangle).” Another participant said, “ $a^2 + b^2 = c^2$ . Find the length of a line using this was awesome.”

The participants responded to the second question about suggestions for improvement in a variety of ways. Some commented on the usefulness of the event or their own perceptions. One participant said, “Geometry is much different than when we [mom and dad] were in school.” Another said, “I am glad to be able to attend these classes; [it] brings family together and [I] learn something new every time.” A third participant said, “Please let there be more family fun nights. We will be happy to come again.” One parent summed up, “Thanks for bringing your math class to Crow!! Something different for my kids! Math shouldn't be so hard (for my kids) as I made it out to be.”

Participants appear to have enjoyed the learning activities presented to them at the FAME program events. Parents commented numerous times how the mathematics at the events was at times a review of topics they had learned in the past and at other times new topics to them. Families stated that they enjoyed working together on the mathematics problems and seemed to appreciate having the opportunity to participate in this type of family involvement program at the school.

#### Research Journal Data

The researcher kept a journal to document obstacles to implementation, adaptations that were made to the program as it unfolded, and the successes of various FAME program events. Stories and reflections from the events were also recorded. The journal served as a source of data for how the FAME intervention was developed and carried out. It also allowed the researcher to record specific behaviors and conversations during FAME events for comparison against data provided by the participants. Sample

entries are summarized and discussed in this section.

### Documenting Implementation

The original plan for FAME was developed in response to a list of questions about this school district and the students who attended the school. Some of the questions were:

- 1) The research was out there that said parent involvement increases student achievement, but what types would be successful at this particular school?
- 2) There were programs already in use around the country that involved mathematics achievement, but were there any that focused on an American Indian population and would that matter?

All of these factors were considered in developing a program that could be evaluated for effectiveness in this community. An initial step was to determine what types of parental involvement may increase student achievement.

Based on research and on available materials, programs and activities were logged into the journal and were eventually identified for use in FAME and approved by the school principal and school board. A plan was developed with the principal to outline how the program would run and when and where the events could take place. All of the notes from these meetings were entered into the journal for later use. The researcher drew on knowledge of the community, to design what a typical event would look like and then used the approved programs to implement this plan. The implementation plan did not change during the given time frame.

### Documenting Successes

Many of the successes of the program came as individual “aha’s” among the participants. Parents were realizing that they did remember how to “do math” and realized that their children were learning math topics that they never saw until high school. Both parents and students felt successful with the mathematics content they were exploring.

Journal entry #1: One 8<sup>th</sup> grade boy was working on a networking problem at a family math night and completed the problem without much trouble. The problem asked him to find a way for a newspaper boy to deliver newspapers along the given routes without backtracking. The boy asked one of his friends to try the activity to see if his friend found the same way or a different way. The second boy found an alternate route. Then, the two boys decided there had to be more ways for the paperboy to deliver the papers. They sat at that station the rest of the evening finding different ways to deliver the papers. The success came from the fact that both boys struggle in math and felt they couldn’t “do math.” I was quick to point out to them that they were great problem solvers.

Journal entry #2: An American Indian father who came with his son one evening was quick to let me know that he did not know how to do math and could his son help him if he needed it. I told him that would be great and if he needed more assistance I would be happy to help him as well. The class started and he was relying on his son to do most of the work. We got to a section on tires and how the numbers on the tires relate to mathematics. He had no trouble helping me out with understanding all of the nuances of numbers on tires. He said he never thought of that as math. After that, he appeared to try



more of the activities without his son’s help.

### TIPS Homework Assignment Data

TIPS homework assignments were designed by the teachers and researcher to provide practice for students and to inform families about topics being learned in the classroom. To accompany the mathematics homework, each TIPS assignment included a “family partner” evaluation piece that was completed by the parent or another family partner. The evaluation consisted of three yes or no questions and one open-ended question that simply stated “Any other comments.” The results of the yes or no questions can be found in Table 14.

The existing data indicate that the family partners had a positive experience with the TIPS assignments. With only a 25 percent response rate, though, it is hard to make a generalization that these assignments were valued by family partners overall. It is possible that the family partners who did respond may have felt they needed to have a positive response since the student’s name was on the paper and the partner had to sign the form. They may not have wanted to admit their child did not understand or complete the assignment.

Table 14: TIPS Homework Assignment

Statement	Yes	No	N/A
My child understood the homework and was able to complete it.	190	14	20
My child and I enjoyed the activity	173	18	33
This homework helped me know what my child is learning in math class.	197	4	23

In addition to answering the yes or no questions, 53 of the 224 responding family partners submitted responses to the open-ended question. The responses were analyzed and sorted into categories by type of response. The 53 responses were obtained from all four math teachers' classes. More eighth grade students returned responses than sixth or seventh grade students. This response was due to the eighth grade teacher's push for his students to complete the homework and the expectations he maintained for his class. Besides creating more TIPS assignments than the other teachers, he calculated the assignments into the students' grades where the sixth and seventh grade teachers did not use them as grades.

Differences in accountability may partially explain the low return rate of the TIPS homework themselves. Three of the four teachers did not hold the students accountable for returning the TIPS assignments even though they agreed to collect data from the assignments. The teacher who did expect his teachers to return the assignments collected a greater portion of the assignments he gave out.

Although most of the responses came from the eighth grade TIPS assignments, the distribution of those from the other mathematics classes was similar to the responses given by the eighth grade classes. The only unique type of response was given by the sixth grade partners, and those were the few negative responses received.

### Positive Comments

Family partners commented on how well their child was doing in math or in explaining what was happening in the classroom. One partner said, "Kylie did a very good job and she understood the problems." Another said, "My child knew what she was

doing to help me understand the activity.” One parent observed: “My daughter knew all the answers and explained most of this to me, except shapes. It is good to know what she is learning.” In a similar context, a parent said “This helped me as a parent know what activities Sydney is doing in math, thanks!”

Some evaluations had comments about how these assignments served as a refresher for the family partner. One comment was, “It’s been so long, from the time I did math in junior high, it is very interesting.” A second partner stated that “He helped me remember what I learned again.” There were also responses that the assignments were fun, including comments such as “I’d like to see more of these types of activities!” and “OMG I enjoyed this very much!” Additionally, one said, “I like practical math.”

Enjoyment of the opportunity to work together was a common theme of the returned comments. One parent said, “She did very good. We enjoy working together on all of her homework when she has homework.” Another person stated, “We had fun together!” A third partner said it “Helps us spend quality time for us.” One comment was, “I think this is a great way for families to get involved with what their kids are learning at school.”

### Negative Comments

Some family partners gave negative feedback about the experience of completing TIPS homework with a student. One family sent back, “Do not have time to sit as a family and do math homework. We returned math inquiry not interested. [Our student] has always done fine and understands the concepts. We are available if he needs us.” A second family responded, “We do homework together every night—mostly algebra—he

is not learning or retaining what is being taught. We don't want to be a family partner to do extra work. We spend at least an hour every night on math.”

A few assignments were returned with comments about the difficulty of the assignments, although the family partners appeared to share responsibility for their difficulties. One family partner said, “He understands some of it but [is] having a hard time with it.” Another said, “I did not fully understand the directions to this project. However we did our best.” A third apologized, “I am very, very sorry for not knowing how or what the math problems are.”

Some family partners sent questions back to the teachers on the TIPS evaluation form. These varied from questions about situations at school to questions about the structure of the assignments. One assignment had an error in terminology, and the family partner went to great lengths to investigate: “We were unsure what a septagon was so we checked in the dictionary and could not find it. All the other polygons were in the dictionary. We asked [our student’s] brother what a seven sided polygon was. We believe septagon should have been heptagon.

### Summary

Data show that family partners generally viewed the TIPS assignments in a positive light. Their responses indicated appreciation for their child’s abilities and greater awareness of the mathematics being taught in the mathematics classrooms. They valued the time spent learning with their child and their own mathematical experience.

### Interview Data

Five family members agreed to be interviewed after the FAME program was completed. The interview participants included an American Indian mother of an eighth grade boy and high school aged daughter; an American Indian mother and father of one girl in the middle school and other girls who were younger; an American Indian grandmother who was raising her grandson; a Caucasian mother and father whose youngest son was a student in the middle school; and an American Indian student who attended almost every event offered. The American Indian mother and father and the Caucasian mother and father both interviewed together as a couple. The other three interviews were conducted individually.

The interview protocol was divided into subsections, each designed to produce data on a specific aspect of the FAME program. In the pages that follow, the interview results are summarized by subsection. The results are followed by a discussion of themes that were identified from the interview data.

#### First Impressions

The interviewees were asked about their first FAME math event and the sense of welcome they experienced. An American Indian grandmother said, “We went to a family math night here in Crow and we did a few of the activities that sounded fun. I was happy that the night was being held in Crow since we have no car to get to town.” An American Indian mother stated, “I think we went to a family math night. There was a potluck dinner that we brought cookies to and my kids wanted to go play the math games. I remember

walking into the library and you were there to greet us and give us directions about where stuff was and what to do.”

It is worth noting that many of the first impressions noted the convenient location and the presence of food, suggesting that attending to basic convenience and comfort are important to promoting parent involvement. Personal attention by the instructor and assistance in getting oriented were also mentioned repeatedly.

You were there to greet us and give us directions right away. Everything was set up and ready for us to do the activities. You gave us a packet of materials and instructions as a family. When we went to the second thing, it was set up like the first and we already knew what to do. (American Indian mother)

We were surprised that we would get to take home all the materials we used that night. We went to the geometry math class that was 8 weeks long. All of were engaged in the activities and could ask questions whenever we wanted. I think that we felt good about what we were doing and we were having fun at school while all of us were learning about math. (American Indian mother and father)

We were always greeted with a smile and you had an estimating activity ready for us as soon as we signed in. You made it comfortable to ask questions and explore the math. We didn't just have to listen to what you said, but we could work together to build our math up. (American Indian father)

This man's wife said, “All of the activities were set up the same so we knew what to do when we got there. You were there to greet us and to make sure we had what we needed.” She went on to talk about whether this sense of belonging affected their continuing the program and noted, “If we didn't like the program we wouldn't have kept going back.”

### Mathematics Content

Interviewees were asked to discuss how the various FAME events contributed to their learning and engagement, and how FAME may have helped their families connect with mathematics in a way that promoted academic success. One mother discussed what activity she learned the most from. She said,

My favorite thing was problem solving how to make an icosahedron out of big sticks and connectors. My family made one half and another family made the other half and when we went to put it together, we had too many sticks. My girls and the other girls figured out what needed to be done so we could put the two halves together. We talked about this activity for a long time. There was no way we could have completed that project without help from another family. Part of that night was just exploring the solids and making them small and then large. I think construction things really helped my girls see the connections between the shapes.

One of this woman's daughters said she also "enjoyed the building activity the most. I liked being able to build the solids using different materials. It was fun and I still remember the names of the shapes we made."

The American Indian grandmother said she would like to see more events take place in Crow so she could attend more often. She went on to talk about her grandson:

He liked the games more than the other activities and we played them at home too. We could take home all the activities and do them when we had time. We were able to get things from nights we did not attend and could do them at home.

When asked how FAME may have contributed to student success, the grandmother said, "My son decided math can be fun and it really isn't that hard." A mother said, "My girls found out that math really isn't that hard and if you think about it in different ways, it is pretty easy." Another mother said, "We found out math can be fun

and that we could play games at home to practice what my kids were learning in math class. It gave us a chance to do math together.”

### Family Involvement

The last portion of the interview inquired about family involvement in mathematics learning and how the FAME program supported that involvement. One mother said, “We spent quality time at the events and then took the activities home to do there as well. We liked having math games to do at home.” She went on to say, “My girls always do their homework and ask questions when they are having trouble. We did get to talk more about math because we went to so many events that we were excited about what we learned and what activities we wanted to try at home.” Her husband said,

I asked their teachers about why they weren’t actively learning in the classroom and explained how much my girls were learning by actually being involved in the activity and not doing a worksheet. I wondered why my girls understood the mathematics at the math events but were having problems in the classroom. I felt like I knew more about math so I felt I could talk to the teachers with some confidence I knew what I was saying.

Some parents said that FAME did not necessarily change their views about participating in their child’s learning, but it did enhance their ability to engage in the process. One American Indian mother said, “I think I have to help my kids with their homework and ask them questions about school. I do not think FAME changed my view, but I think it gave us more to talk about.” An American Indian father said,

My role is to support my girls the best way I can. One way is to help them with their homework and ask them questions to make sure they understand. Another role is to ask questions at school to make sure my girls are getting the best education they can. I don’t think my views changed, but I am thinking about math in different ways. We use more hands-on learning at home.



### Interview Themes

*Family* is the central theme that emerged from the interview data, and it plays an influential role in how participants perceived the FAME program. Adults and children wanted to do something as a family. The adults were seeking out ways to be involved in their child's learning inside and outside the home. The children enjoyed spending time with their family while sharing what they are learning in mathematics at school. The value of family is central to the Crow culture and was supported by the structure and welcoming environment of the FAME program.

We were all learning. My husband thought he knew everything about math but found out he still had some things to learn. We were able to take materials home and do them together there so we continued to learn during the week. We wanted to find something to do as a family and helping our girls understand math was a great way to do that. (American Indian mother and father)

We enjoyed the activities and it was fun. My mom and dad and my little sisters all learned about the math I was doing at school and some that I wasn't. It was fun. We had something to do at school that wasn't playing sports because I don't like to play sports, but would like to do more things with my family and the school only offers two things during the year for the middle school kids to go to. (American Indian student)

All of the interviewees to the FAME experience as fun or as something different to do with the family. One mother said, "My kids thought the math night sounded like fun and I wanted to do something with my kids at school that wasn't sports. I thought the night sounded like fun too." One mother said, "My husband and I thought this was a great way to spend time with our daughters while helping [mom and dad] with their mathematics. We have discovered they do a lot harder math than we did at their age."

Support was repeatedly mentioned in the context of adults wanting to support their child's learning or families wanting to support one another. Similarly, the families

identified elements of support built into the FAME program that helped them feel comfortable and motivated them to participate. The first of these themes, *welcome*, was previously identified in the review of literature, specifically explored in the interviews, and confirmed by this study. The second and third themes, *structure* and *accessibility*, emerged from the FAME program data.

### Welcome

The families seemed to feel that a welcoming learning environment at the events was important for their continued participation in FAME, a perception that aligns with research on the success of family involvement programs. Ferguson (2008) tells us that creating a sense of welcome - a welcoming environment that fosters family-school partnerships - transcends context, culture, and language. That sense of welcome has a direct effect on families' involvement in their child's education (McGrath, 2007; Phillipson & Phillipson, 2007; Stewart, 2008).

The families noted that the FAME instructor played a pivotal role in creating the sense of welcome, both through *hospitality* and *respect*.

We were always greeted with a smile and you had an estimating activity ready for us as soon as we signed in. You made it comfortable to ask questions and explore the math. (American Indian mother and father)

We were free to do what activities we wanted and could come and go as we wanted. You helped us and asked us how we were doing. (American Indian grandmother)

I don't think we would have continued with the program if we didn't feel welcomed and respected for what we already know. (Caucasian mother and father)

Finally, the serving and sharing of *food* is central to Crow cultural gatherings, and food served at the FAME events clearly contributed to families' sense of welcome.

### Structure

The structure of the program was *flexible* and *familiar*. Families felt welcome and safe at the events they attended because they could arrive and leave as their own schedules directed. Families who returned to a second event found the setup to be the same as the last event. Families knew what the expectations were and were not reliant on someone to tell them what to do each time.

When we went to the second thing, it was set up like the first and we already knew what to do. (American Indian mother)

We could take home all the activities and do them when we had time. We were able to get things from nights we did not attend and could do them at home. (American Indian grandmother)

You made sure we had everything we needed and asked us how our week was going and about our other kids. We enjoyed being able to come and know what was expected of us when we got there. (Caucasian mother and father)

### Incentives

*Incentives* included door prizes, drawings for \$500, \$100, \$50, and \$25 VISA gift cards, and the FAME store where students could exchange their FAME points for school related items. Less tangible incentives were the novelty of the FAME program, the fun created at the events, and the challenge of the materials.

At least some of us went to almost everything that was offered. We were the big winners with FAME points because we attended so many things. We were all learning.

We had fun the first time and my kids wanted to meet a couple of friends there. After that, my kids were playing sports and we didn't have time to go to anything else.

We attended the entire geometry course and went to some of the workshops. We enjoyed the challenge and having time to work as a family on something different than the usual.

### Accessibility

The family needed to sense that the program was accessible, which in this context includes offering the program in a *convenient* location and providing program materials in a *timely* manner, as well as helping the participants feel prepared and capable to succeed at the event. When family members feel invited, and believe they have the knowledge, skills and resources to support their children's education, they are more likely to be engaged in their children's educational activities (Ferguson, 2008). Families felt that the FAME program provided the resources they needed to fully access the mathematical experiences that were provided.

I was happy that the night was being held in Crow since we have no car to get to town. You met us at the door and gave us materials from other nights we could not make it to. (American Indian grandmother)

We enjoyed being able to come and know what was expected of us when we got there. You made sure we had everything we needed. (Caucasian mother and father)

We knew what to do when we got there and you always had things out and ready for us. We could ask you questions and help my friends if they needed it. (Native America student)

In this case, accessibility also referred to materials and activities that supported *continuous learning*. Continuous learning refers to the learning that occurred between

FAME events. Families were given activities and the materials necessary for completing the activities so they could continue to learn about mathematics as a family at home.

### Interview Summary

In general, the interviewees felt they have a better understanding of what their children are learning at school and different ways to help them at home. They learned how important it is to spend quality time with their families and discovered they can be involved in the school even if they don't play sports. They found out math can be fun, that their children can do math, and that the adults can still do math even though they sometimes had to ask questions.

Many of the interviewees said they wished the district would offer nights like these for other subject areas as well. They would be willing to attend academic-related nights at school in order to see what is happening in the classroom. One person stated, "I wish the school district would continue this program after you leave. For families who are not into sports, this is a great way to do something as a family that involves school. We want our girls to be involved in school activities and have positive experiences with math because math is so important to life. The career parts of the activities make the events even richer because some of these careers are ones I would never think of. Who knew the packaging industry was so full of math and so big?"

### Synthesis of the Data

The findings from participant interviews, FAME evaluations, TIPS evaluations, surveys and researcher observations have significant areas of overlap. Recurring themes

emerge from these data sets when they are viewed as a whole. These include: family; fun; appropriately challenging mathematics; and the desire to participate in a family involvement program in mathematics.

The importance and value of *family* was a major theme identified throughout the FAME evaluations, TIPS evaluations, and interview data. Families appeared to enjoy working together on learning activities whether it involved a game, a homework assignment, or taking a class together. This theme was very evident in the interview data and was supported by both the evaluation data from FAME events and TIPS assignments.

An emphasis on *fun* and *appropriately challenging mathematics* also appeared in the interview data and was supported in the evaluation data and the TIPS data. Most participants at some time mentioned that the activities were fun and they appreciated that the math was not too hard to succeed or that it was adequately challenging.

The survey data gave background information about the population involved in the experiment. Those who participated in the program supported having a family involvement program with a focus of mathematics. The interview data further supported this desire to have a mathematics focused family program. Families mentioned that they would like to see more events like FAME for other subject areas and hoped the program would continue after the FAME experiment ended.

### Summary

Data from surveys and interviews demonstrated how students and families in this study perceived the family's role in supporting mathematics learning. Parents felt it was their responsibility to make sure that their child learns at school and to keep track of their

child's progress in school. They felt responsible for teaching their child to value schoolwork, and the majority of the parents felt it was also their responsibility to contact the teacher as soon as academic problems arise. Most parents felt it was a parent's responsibility to show an interest in their child's homework and to help them complete it. Students responded that they enjoy having a parent help them with schoolwork.

Although the process of implementing the FAME program did not change significantly over time, participation did vary. The planned events went as scheduled, but were not as heavily attended as expected. When basketball season hit, the attendance rate notably decreased. The logistics of the events were consistent over the two-semester period and participants liked the way the events were organized. Participants that lived in Crow Agency would have liked to see more events held there.

Ultimately, how did families respond to and participate in the FAME program? The findings indicate that families desired to support their children in learning mathematics, and that many of them appreciated participating together in a program that offered fun and appropriately challenging mathematical experiences. They valued the design of such a program for its structure, accessibility, and sense of welcome. The next chapter provides interpretation and discussion of these findings.

## CHAPTER 5

## CONCLUSIONS

This chapter opens with a review of the study purpose. The findings are then revisited in the context of the research questions. The final sections discuss the implications of the findings for providers of family involvement programs in mathematics in American Indian communities; offers recommendations to school district administrators and school boards; and suggests recommendations for further research.

Review and Purpose of the Research Study

Research suggests that parent involvement is positively correlated with academic success for most students, and the more parents are involved in a child's education, both at home and at school, the more academically successful the child will be (Ingram, Wolfe, & Lieberman, 2007). The Families Achieving Mathematical Excellence (FAME) program was designed to increase family involvement in mathematics at a rural school serving a high proportion of American Indian and low income students living on or near an American Indian reservation. The goal of the study was to obtain a comprehensive understanding of the process of implementing a program designed with this particular setting in mind. This comprehensive understanding included an examination of the effectiveness of different program components and an analysis of how their effectiveness was related to this unique context.

The FAME program was developed using components from three research-based programs already in use in schools around the country. The Family Math program from the University of California-Berkeley and Math and Parent Partnerships in the Southwest



(MAPPS) located at the University of Arizona are two programs that bring families together to learn about mathematics through middle school mathematics workshops or mini-courses designed to engage both students and parents. Teachers Including Parents in Schoolwork (TIPS) interactive assignments, developed at Johns Hopkins University, were designed to a) increase students' ability and willingness to talk about schoolwork at home, b) increase students' knowledge of the uses of school skills in the real world, and c) improve students' skills and homework completion (Epstein, 2001).

During the design and decision making phase for this study, recommendations for American Indian education served as a guide. For example, family mathematics programs were reviewed with the intent to choose ones that connected mathematics to everyday problems and locally or regionally available career opportunities, in keeping with recommendations to relate the curriculum to students' lives. Also, the FAME program was designed as a family involvement program versus a parent involvement program to meet the traditions of local American Indian families.

Although literature exists describing the benefits of parent involvement (Bouffard & Stephen, 2007; Anderson & Minke, 2007; Ingram, Wolfe, & Lieberman, 2007) and the effectiveness of these programs (Epstein & Van Voorhis, 2001; Civil, Bernier, & Quintos, 2003; Taylor-Cox & Oberdorf, 2006) very little research exists documenting the benefits of such a program with a population of American Indian families. Therefore, this study also attempted to add to this limited research base.

Chapter Four presented the findings of this study in detail. In summary, the results indicated that participating families had positive experiences within the program. Families enjoyed working together to learn new mathematics topics and, the adults had

the opportunity to refresh knowledge of some mathematics topics they had not used lately. Although the number of participants was relatively low, typically involving just 6 to 15 adults and children, those who did participate indicated they gained mathematics content knowledge and had positive experiences with their children. The study also provided useful findings regarding program characteristics that fostered initial and continuing family participation in the program.

### Research Questions and Findings of the Study

This mixed-methods study combined data from parent and student surveys, FAME program evaluations, interview data, and the researcher's own observations to answer the following research questions. The questions and a brief summary of the results for each question follow.

*Prior to involvement in FAME, how do students and families perceive the families' role in mathematics education?*

Quantitative analysis of the survey data shows that parents responded that the school provided little communication to the families about invitations to participate in school activities; how to help their children with their homework; and community happenings. Half of the families indicated that the school did a good job inviting parents to parent teacher conferences. The parents did respond that the school was welcoming, and they felt the teachers and staff cared about their children. School events were well attended by families. Parent involvement at home was rated highly. Parents indicated they already asked their children how school was going, helped check their homework, and reviewed vocabulary with them. Parents indicated that they were responsible to make

sure their children learn in school and felt good about their efforts to help their child in school.

Students indicated that they were good at their schoolwork and could do the work in their classrooms. Students had a sense of belonging to the school. About half of the students reported their parents attended school events and three-quarters responded that their parents asked them how they were doing in school. Parents helped them with their homework and reviewed work with them. Students indicated that their parents talked to the teachers at school and believed their parents felt welcomed at the school.

Limitations of Surveys: There are advantages and disadvantages to using surveys to gather data. The advantages of using a survey in this study included that it was potentially a quick way to collect information from a large portion of the population (Colorado State University, 2010). The disadvantages of using surveys included that the respondents may answer superficially and participants may not be willing to answer some or all of the questions. The participants might not want to reveal information that is personal or they may feel they will be penalized if they give their real opinion (Colorado State University, 2010).

*How does the process of implementing the FAME program evolve over time?*

A flexible and familiar structure was a key component to the families who attended the events. The participants liked the fact that when they arrived they knew what to do if they had attended an event before. The FAME program was designed to meet the needs of the community by being culturally sensitive. In this community, culturally sensitive meant that the participants felt welcomed every time they arrived at an event;

food was available at each session and provided by the participants if they so chose; events were held in the two main towns where the participants lived; and participants could arrive and depart as needed. Participants could miss a session and still receive the materials for that session if they desired.

One aspect of the program did change. Food is an important part of any gathering in this community. The initial plan was to hold potluck dinners at the events so families did not have to go home and cook before attending the event. This appeared to be a good idea, but the participation in the potluck was low. One reason for that may be that the poverty level in the community is high and people could not afford to bring a dish to share for dinner, and felt intimidated to come without something. The change came when families were invited to bring cookies if they wanted to and I provided juice and cookies as well. This seemed to be a hit. Some families brought cookies every time they attended and some did not bring any at all, but there were always snacks for everyone.

A barrier to program attendance was transportation. Many families lived outside of the town where the school was and had no vehicle or fuel to get there in the evenings. One way to combat this barrier was to hold events in the town where many of the families lived. Families did enjoy the fact that they could participate when the event was in their town, but some were unable to attend the mini-courses because they were held at the school only. One change I would make in the future is to offer mini-course sessions in more than one location to improve access for more families.

The “family math night” events held in both towns were the best attended. This may be because they were held once a month so the time commitment was not great compared to the mini-courses. The mini-courses were the next best attended component

of FAME even though they were held only at the middle school. When interviewed, these were the events that were referred to as being positive experiences.

A key component to the FAME program was the flexible attendance policy. Families needed to feel they could attend when they could and that there would not be a penalty of any sort for not being at every event. Designing packets for parents to take home with them was the best solution I found that would allow this flexibility. Each participant received all of the printed materials as well as every manipulative and/or special material necessary to complete the printed activities. Families who attended any event were able to pick up packets from events they were unable to attend. This created the opportunity for all families to access the content even if they were unable to attend an event.

Selecting mathematics content that was aligned to the school district's mathematics standards was important. Choosing topics that students were currently learning about in the classroom enhanced the learning of those topics. Students were exposed to the topics for a greater length of time and parents were able to give support to their children while they were learning these new topics. Choosing mathematics content that met standards yet were delivered at the different levels of the participants was part of the design that made the program both flexible and accessible.

Due to a very limited time frame, only so many mathematical experiences could be created for the families. Families responded positively to the "real world" mathematical connections to everyday items like tires and packages. Most activities given to the families were set in context giving families a way to make connections between school mathematics and their lives. Parents, mainly, reacted to the more formal

mathematics as a review of what they learned in school, yet they did not remember having anyone help them make the connections to their own worlds at the time. I believe that selecting mathematical situations that reflect what is experienced by the families every day helps build the mathematical connections learners do not always make on their own.

Through a variety of pedagogies, the participants were able to access the content. The majority of the mini-course and workshop activities were designed to work in small groups or pairs. Usually families worked together, but occasionally family members would work with members of other families by choice. The activities were arranged so that families could work at their own pace with large group discussions to tie the activities together. Family math nights were designed so that families could work together at their own pace and allowed families the freedom to move from activity to activity.

The mini-courses were designed to span the K-8 mathematics curriculum by content strand. I believed, at the beginning, that they would not be well-attended due to the time commitment. This did not prove to be true. The mini-courses were regularly attended by families and not only gave the parents the opportunity to learn about middle school mathematics, but also what mathematics comes before and after the middle grades. The lessons were linked by the common strand and built upon one another from what elementary students would learn to what pre-algebra students would learn. I believe this aided parents who had children in a variety of grades and at a number of levels.

TIPS interactive homework was not as successful as hoped. More training needed to be offered for the teachers and more information about the program needed to be sent

out to the families. I believe that in order for this program to work, there must be “buy-in” from the teachers and parents. The importance of students being able to discuss mathematics outside the classroom may need to be stated more clearly. The 8<sup>th</sup> grade teacher seemed to have success with the program because he saw the value of having his students talking about mathematics and he understood that in order to really know something you have to be able to explain it. The teachers, who believed the TIPS assignments were just an add-on, even though they agreed to participate, were not as successful at getting students to return the homework.

To increase ‘buy-in’ by the teachers, I would recommend that schools review their homework and parental involvement policies to find a common connection between the two that may lead to an incentive for teachers and families. This incentive may come in the form of increased communication between home and school that leads to a better understanding of what is going on in the classroom and in the home. Administrators may need to hold teachers more accountable for the homework they send home and the expectation of the return of that homework for assessment.

*How do families respond to and participate in the FAME program?*

Response to the FAME program was positive for those who attended the events. Based on interview data, families enjoyed the welcoming environment and the ability to choose among learning opportunities throughout the year. Some participants attended almost every event and some just came once because that was all the time they had. Participants invited other families to join them at FAME events and those families continued to come after that. Families would bring younger and older students to the

events and would bring their children's friends with them. One time a mother could not be there on time because of a meeting and asked if her son could attend without her until she was able to arrive. The son attended and joined in with another family until his mom arrived later in the evening.

Participation rates were low in comparison to the school population, but the district parent involvement center has noted that it took them a few years to get the following they have at events like Bingo for books, family game nights, and parenting classes. If the program continued beyond one year, in light of the positive responses from those who attended occasionally or regularly during this study, it is possible that participation rates would gradually improve.

Participation Rates for TIPS vs. Other Interventions: The data for the TIPS assignments showed the participation rate was low. Although the participation rate was not as high as expected, families who did participate in this in-school intervention were mostly families who did not participate in the after-school interventions. This leads me to believe that the TIPS assignments were an avenue for family involvement for families who did not want to or could not participate in the afterschool interventions.

Out of a student population of three hundred sixty-five, one hundred ninety-two students (53 percent) returned at least one TIPS assignment, but did not participate in any afterschool interventions. Eleven students (3 percent) returned at least one TIPS assignment and participated in at least one afterschool interventions. Out of the remaining students, seven (2 percent) students attended at least one intervention, but did not return any TIPS assignments.



### Findings Related to Previous Research

Schmitz, Wagner & Menke (2001) suggested that parents can be taught simple and time-efficient ways to help their children at home. Activities that include parents with their children should be scheduled such as family math nights. Conferences and activities at school can be scheduled at convenient times for parents and should be held at locations that are accessible to families without transportation. These findings are similar to the findings in this study. FAME parents were open to try new ways to help their children at home and were able to practice those skills at the math courses and family math nights. Also, holding the events at two locations gave the families with limited transportation the opportunity to participate.

Annette Lareau (1987) studied how social class influences the process through which parents participate in their children's schooling. Lareau found that parents in both communities valued educational success but differed only in the level of education they hoped their children would attain. She reported that the working-class parents had poor educational skills and limited time and income to supplement the learning going on in the classroom. The middle-class parents had high educational skills and the time and income to support their children's learning outside the classroom. Lareau recommended that schools that want to establish home-school partnerships must address the issue of social class differences through boosting the educational capabilities and information resources of parents. This did not appear as great an impediment to parent involvement in the district where my research occurred, given the results of my study.

Eighty percent of the parents who returned the survey stated a belief that their

children would graduate from a higher education facility. Ninety percent of the parents graduated from high school and forty-eight percent graduated from college. The school's rate of free/reduced lunch was at seventy-one percent. Furthermore, ninety-seven percent of the respondents agreed with the statement "It's the parent's responsibility to teach their child to value schoolwork". I believe this study offers an alternate perspective regarding Lareau's findings that social class influences family involvement in schools. Also, this data suggests that when family incomes are low and parental education levels are high, greater than expected parent involvement can occur. I would suggest more research could be done to find out if this is just an anomaly for this community or if these findings occur in other communities.

#### Implications for Providers of Family Involvement Programs in Mathematics in American Indian Communities

Implications of this research project are relevant to facilitators of family involvement programs, especially those being designed for and implemented in American Indian communities. The findings of this study indicate that the design of the program must be culturally appropriate for that community. In this case, I had been living and working in the community for the past fourteen years and grew to understand the academic needs of the students and families the school district served. I had also developed an understanding of the community members' cultural backgrounds and what typical gatherings were like. Because of this, I had some preliminary insights into what would or would not work when it came to developing a family involvement program in mathematics. In light of the findings, some of these preconceptions were reaffirmed, and

others were revised.

### Creativity for High Response Rates

Being creative can get you high response rates on the return of surveys and questionnaires. In order to get high response rates for the opening surveys in this study, I asked the school office if I could send the surveys and student permission slips home with the initial paperwork for the school year. We devised a plan to put the required school paperwork on one side of a two-pocket folder and the FAME material in the other pocket. On the required paperwork side, we developed a checklist of all the materials in the folder so parents could check off what they completed and were returning. I believe this is why I had a high return rate for the parent survey and student permission slips to complete the survey.

Furthermore, to get the student survey completed, I arranged to take all of the students with permission to take the survey to the auditorium to complete the survey at one time. The school and teachers were supportive of this method of data collection. I asked the school counselor and one other staff member to help me facilitate the survey taking. We were able to get all of the students who were present that day to complete the survey at one time and we then had a second, smaller session for those absent on the first day.

### Methods of Welcome

A sense of welcome was of high priority for this program to be successful. Many parents and grandparents do not feel welcome in schools due to their own prior experiences. In order for a family to feel comfortable attending, they had to feel

welcomed and respected. This can be done by greeting families as they arrive and having conversations with them about their lives and their families. A structure that is familiar, predictable in format, and flexible is also welcoming, according to the respondents. The design of FAME encouraged families to attend when they could. Being late to or leaving early from a function was not a problem because the structure was flexible. Families could arrive at any time and join right in with the learning. Families who were unable to attend an event could request the materials for that event and do the activities at home.

#### Selection of Mathematics Content and Family Mathematics Programs

Selecting mathematics content and family mathematics programs that have the potential to fit into a flexible attendance policy was important. As much as possible, the mathematics content should be tied to the national, state, or district mathematics standards and linked to what is happening in the classroom. This means that the provider must get input from the teachers about what is being taught and when. Tying the content to the classroom enhances the students' learning and gives the parents the assurance they can help their children at home.

#### Availability of Materials

Making materials available and affordable is imperative. Families living at or near the poverty level want the best for their children. Providing family members with the tools and materials to use at home gives them the opportunity to continue their learning at home. Each participant received his or her own set of math tools, game pieces, and paper materials to complete every activity presented. Families were fairly shocked that they would get to keep all of these materials and were grateful for the opportunity to receive

them.

### The Importance of Food

Food was an important aspect of the events. American Indian tribal culture revolves around gatherings, and where there are gatherings there is food. Providing cookies and juice was a way to incorporate this cultural theme into the events. Giving the participants the opportunity to bring cookies if they wanted gave some families a way to give back. By making the cookie sharing optional, no one felt excluded from attending. This is important in making the learning environment welcoming and encouraging families to return.

### Logistics

Providing events at multiple locations just made sense for logistical reasons. Some families could not participate in the programs if they had to go to the middle school, so I brought the programs to them. The middle school is in one town and many of the families live in another town. Bringing the program to both towns was time consuming yet rewarding. Many families did not have transportation to travel the fifteen miles to the middle school, so having events in their community was a perfect match. Families appreciated having access to some of the events because they were held close by. If possible, I would hold more events at this secondary location to make the program more accessible to more people.

### Limitations of Program Types

I recommend that designers of family involvement programs limit the types of

events that are offered. Part of the research background for this study was to identify which programs might work better than others. I would not incorporate all of these programs at the same time again. A simpler approach would be to host family math nights once a month and offer an additional mini-course for those who want to increase their content knowledge. TIPS assignments should only be incorporated if the teachers at the school are willing to collaborate in creating them. Implementing only one or two different programs at a time might provide a better assessment of their success for that community.

#### Summary of Implications

In summary, this study suggests that a successful family involvement program in mathematics will create a welcoming learning environment with a flexible and familiar structure; bring the program to the people; provide materials and food for every participant; and limit the number of types of activities offered. The motivation for all of these decisions is designing a program that is culturally responsive to the community of people who participate. The program may take a while to catch on so do not be discouraged. Welcoming families to increase their learning and spend time together will attract other families who want to be a part of their children's learning. If you touch the life of one person, all of the work is worth it.

#### Recommendations to District Administrators and School Boards Regarding Support for Family Involvement Programs in Mathematics in American Indian Communities

Research shows that principals and superintendents play an essential role in building family involvement (Bouffard & Stephen, 2007). Principals' and superintendents'

outreach to families sends home the message that families are welcome and important partners in increasing achievement (Bouffard & Stephen, 2007; Van Voorhis & Sheldon, 2004). The parents and students seemed to enjoy having the principal attend some of the events. I feel having the principal there helps solidify the idea that the school wants to work as a team with the family. Having the support of the district administration was important not only for the presence they could make at the events, but for the funding of such a program.

### Materials For All

Making all of the materials available to all of the participants is an expensive undertaking. Fortunately my district supported the participants by earmarking funds for family involvement and they encouraged me to get the materials the families needed. The parents seemed to appreciate the fact that the district as a whole supported them in their quest to help their students in mathematics. Having the superintendent and the school board make public that they support this type of program goes a long way with the community.

### Administration and School Boards Getting Involved

District administrators and school boards must embrace the idea of being involved with the families that make up their community, in particular by getting involved with the planning and implementation of programs. When the administration backs a program there appears to be more buy-in with the teachers. And when parents see that the entire school community finds family involvement important, they will see it as important as well and may get more involved.

### Support and Encouragement

This study confirms the notion that family involvement programs should be supported and encouraged. A great deal of research informs us that parent involvement helps to increase the achievement levels of our students. When parents feel they can help their students, more discussion and interaction with the subject areas will occur. Parent involvement programs can be one way to help increase student achievement without making changes to the actual school day. Lastly, creating parent involvement programs can help increase home/school communications and create a sense of welcome at the school.

### Getting the Word Out

One way administrators can support family involvement is through helping with advertising. Getting the information out to the families is critical. Perhaps a newspaper would donate an advertisement for the program, or a business might donate space on a lighted sign. The school district could print and hang posters around the community to encourage families to participate. Schools could even sponsor a poster contest for the students and hang the winning posters in prominent locations around the community.

### Incentive, Incentive, Incentive

Administrators could create an incentive program to get families and educators involved in the programs. Investigate whether area businesses have special funds for schools and other groups—many businesses do if you make arrangements with them ahead of time or fill out their applications. Donated items from area businesses or families can also be prizes or incentives. I found that it did not matter if I was giving



away pencils, markers, books, or money; participants were excited to get something. Educators enjoy these incentives as well. Getting more teachers involved in the programs aids in the building of trust between home and school. I found that the families enjoyed having a guest teacher sit with them at an event. The atmosphere was informal and the discussions were open to anything.

#### Long-term Commitment

It is important that school districts commit to family involvement programs for more than one year. After talking to one of the parent involvement offices at the school district, I found out that their programs that were successful took two to three years to really start getting the participation they had hoped for. This indicates that families will participate if they see that the program is worthwhile and safe; it may just take more time than the schools and facilitators sometimes want to give.

#### Other Ways to Support Family Involvement Programs

Other ways districts can encourage participation are by providing materials for the families to use and take home; providing food and drink for the participants; dedicating a space for the program to be held and materials to be stored; and providing a shuttle service of some sort to solve the transportation issues. I recommend that districts do whatever they are able to do to support family involvement programs in their districts. The outcomes have been researched and the findings are positive. Supporting a well-designed family involvement program will benefit not only the families, but the entire district and community as well.

### Suggestions for Further Research

Investigating the importance of family involvement in education spans thirty years of research with little to no research in the area of family involvement programs in American Indian communities. This study did find connections to current research; some of these connections are described in this section along with suggestions for further study of family involvement.

#### Sense of Welcome

Ferguson (2008) tells us that creating a sense of welcome – a welcoming environment that fosters family-school partnerships – transcends context, culture, and language. That sense of welcome has a direct effect on families' involvement in their child's education (Stewart, 2008). When family members feel invited, and believe they have the knowledge and skills to support their children's education, they are more likely to be engaged in their children's educational activities.

The importance of a welcoming environment was supported in this study from the interview data. Families felt welcomed and respected and this influenced whether they continued to attend the program events. Research on how to develop a sense of welcome within an American Indian community, and how strategies preferred in a particular tribal community may differ from those appropriate elsewhere and is an important area to explore.

#### Family Mathematics Programs

The goal of a family mathematics program is for families, regardless of their prior

mathematics experiences, to engage and be successful in meaningful mathematics and for parents to support and advocate for their children's mathematics education (Thompson & Mayfield-Ingram, 1998). In the context of this study, meaningful mathematics would include materials that are culturally relevant and ways of learning that are comfortable for families. Research and development of these types of materials for American Indian populations is a huge task, but can be accomplished through partnerships between tribal leaders, educators and researchers.

The mathematics content that is intended to be used in a family mathematics program could be researched. Which topic areas and types of mathematics activities are most fruitful to use with families? How can the mathematics offered to families effectively align with the mathematics taught in schools? Along with these questions, research on the difficulty level and cognitive level of the mathematics activities used in a family mathematics program is important for meeting the needs of all participants.

### Flexible Structure

There are valid reasons for family members not to attend or engage in school activities (Ferguson, 2008). Families have their own schedules designed to meet the needs of each of their members. Designing a flexible structure to accommodate these varying schedules is important for maintaining the sense of welcome. However, does ensuring a flexible schedule work against including rigorous mathematics content? Can parents keep up with the flow of mathematics content being presented if they are unable to attend every session? This is a question that needs to be addressed to aid the development of family mathematics programs that are efficient and effective, have

rigorous mathematics, and yet are still flexible enough to meet the demands of each family's schedule.

### Why Parents Get Involved

Parents' beliefs that they can affect their children's education, their sense that the school desires their help, and their own comfort levels have all been claimed as predictors of parent involvement (Sheldon, 2002). The results of the parent survey indicated that the parents at this school were committed to helping their children with their learning and were comfortable being involved in their children's education regardless of whether or not they participated in the FAME program.

Whether parents who are involved in a family math program are involved in their children's education to different degrees than those who are not involved remains to be seen. The parents who attend structured programs are definitely involved in their children's education, but do they do more at home with their children? Were some parents already involved at home to a greater degree than those attending the FAME program? Does one type of involvement increase student achievement more than another? These are questions that needed to be looked at more closely.

### Home Support

Finally, it is worth studying whether family involvement leads to increased home support for completing homework, participating in class, or "trying your best" on standardized tests. Does participation in a family involvement program influence discussions at home about mathematics and school? What types of features and prompts can be built into a program to encourage the idea of increasing home support for mathematics learning?

### Conclusion

Family is central to the American Indian community and the rural communities that are served by this school district. All parents want the best for their children and want to see their children succeed. Teachers and administrators want students to become life-long learners. Involving families in education just makes sense. If we work as a community, the community becomes stronger—in this case, stronger mathematicians.

Getting the support of the administration and school board was a great way for me to get started on this journey. Once they understood why it is important to involve families and what the benefits could be, their approval gave me the backing I needed to request funding necessary to make the program work the way I intended.

The surveys gave me an indication that our parents and students were interested in being involved as a family in mathematics. They also helped dispel the idea that our parents just do not care and that is why they do not attend things. The FAME events gave me a new perspective on the families we served in the district. I could better understand why families did not attend events all of the time and I could then pass this insight on the teachers and the administrators.

I found the joy that comes from helping others become the people they want to be. Parents did not like to not know how to help their children with school. Because I was giving them ways to work as a family and community, I found satisfaction in the amount of time and effort it took to plan and organize all of the events. I made a pact with myself that if even one family showed up to an event it was a success and I would teach that family as if there were a room full of people. Keep in mind that there probably would not

be a roomful of people the first time you offer a family math event. Remember that you are there to help those families who do come find a way to be more involved in the education of their children. Word of mouth about successful events is the best advertisement available for this type of program.

Have you ever wondered why you would spend years of your life dedicated to a cause others may feel is a waste of time? I have. This journey to create an effective family involvement mathematics program that works for the rural American Indian community in which I have spent fourteen years of my life, gave me an opportunity to give back to the community for all of the wonderful things I have received from it. When others felt the program was a wash because of low attendance, I saw it as just the beginning of something great. Whether you plan to design a family mathematics program or you want to be involved in a program that has been developed, keep in mind the ideas of family togetherness, a welcoming environment, and a flexible structure. These are a winning combination for a successful program.

REFERENCES CITED

- Adams, D. W. (1995). *Education for extinction: American Indians and the boarding school experience 1875-1928*. Lawrence, KS: University Press of Kansas.
- Agbo, S. A. (2007). Addressing school-community relations in a cross-cultural context: A collaborative action to bridge the gap between first nations and the school. *Journal of Research in Rural Education*, 22(8).
- Anderson, K. J., & Minke, K. M. (2007). Parent involvement in education: Toward an understanding of parents' decision making. *The Journal of Educational Research*, 100(5), 311-323.
- Apthorp, H. S., D'Amato, E. D. & Richardson, A. (2003). *Effective standards based practices for Native American students: A review of research literature*. Washington, DC: Institute of Educational Sciences, U. S. Department of Education. Retrieved on December 6, 2009 from [www.mcrel.org](http://www.mcrel.org).
- Auerbach, S. (2007). From moral supporters to struggling advocates: Reconceptualizing parent roles in education through the experience of working-class families of color. *Urban Education*, 42(3), 250-283.
- Bakker, J., Denessen, E., & Brus-Laeren, M. (2007). Socio-economic background, parental involvement and teacher perceptions of these in relation to pupil achievement. *Educational Studies*, 33(2), 177-192.
- Balli, S. J. (1995). *The effects of differential prompts on family involvement with middle-grades homework*. Columbia, MO: University of Columbia.
- Balli, S. J., Demo, D. H., & Wedman, J. F. (1998). Family involvement with children's homework: An intervention in middle grades. *Family Relations*, 47, 149-157.
- Balli, S. J., Wedman, J. F., & Demo, D. H. (1997). Family involvement with middle-grades homework: Effects of differential prompting. *The Journal of Experimental Education*, 66(1), 31-48.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: WH Freeman and Company.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26.
- Barajas, H. L., & Ronnkist, A. (2007). Racialized space: Framing Latino and Latina experience in public schools. *Teacher's College Record*, 109(6), 1517-1538.
- Barrera, J. M., & Warner, L. (2006). Involving families in school events. *Kappa Delta Pi Record*(Winter).
- Berliner, D. C. (2006). Our impoverished view of educational research. *Teachers College Record*. 108(6), 949-995.



- Bogdan R. B. & Biklin, S.K. (1998). *Qualitative Research for Education: An Introduction to Theory and Methods*. Third Edition. Needham Heights, MA: Allyn and Bacon.
- Bouffard, S. M., & Stephen, N. (2007). Promoting family involvement. *Principal's Research Review: Supporting the Principals Data Driven Decisions*, 2(6).
- Butterfield, R. & Pepper, F. (1991). *Improving parental participation in elementary and secondary education for American Indian and Alaska Native students* (Report No. RC-018-612). Washington, DC: U.S. Department of Education. (ED343763)
- Campbell, P. F., and Silver, E. A. (1999). Teaching and learning mathematics in poor communities. Reston, VA: National Council of Teachers of Mathematics.
- Cancio, E. J., West, R. P., & Young, K. R. (2004). Improving mathematics homework completion and accuracy of students with EBD through self-management and parent perception. *Journal of Emotional & Behavioral Disorders*, 12(1), 9-22.
- Carger, C. L. (1997). Attending to new voices. *Educational Leadership*, 54(7), 39-43.
- Caspe, M. & Lopez, M. E. (2006). *Lessons from family-strengthening interventions: Learning from evidence-based practice*. Cambridge, MA: Harvard Family Research Project.
- Caspe, M., Lopez, M. E., & Wolos, C. (2007). *Family involvement in elementary school children's education*. Cambridge, MA: Harvard Family Research Project.
- Civil, M., Bernier, E., & Quintos, B. (2003). *Parental involvement in mathematics: A focus on parents' voices*. Paper presented at the annual meeting of AERA, Chicago, Illinois.
- Coatsworth, J. D., Pantin, H., McBride, C., Briones, E., Kurtines, W., & Szapocznik, J. (2002). Ecodevelopmental correlates of behavior problems in young Hispanic females. *Applied Developmental Science*, 6(3), 126-143.
- Colorado State University (2010). Writing guide: reliability and validity. Retrieved March 1, 2010 from <http://writing.colostate.edu/guides/research/relval/index.cfm>
- Commissioner's Parent Advisory Committee (PAC) (2007). *The missing piece of the proficiency puzzle: Recommendations for involving families and community in improving student achievement*. Kentucky Department of Education.
- Cooper, H., Jackson, K., Nye, B., & Lindsay, J. J. (2001). A model of homework's influence on the performance evaluations of elementary school students. *Journal of Experimental Education*, 69(2), 181-199.
- Corno, L. (2000). Looking at homework differently. *The Elementary School Journal*, 100, 529-548.

- Creswell, J. W. & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into Practice*, 39(3), 124-131.
- Creswell, J.W. (2009). *Research design*. Thousand Oakes: Sage Publications.
- Dauber, S. L., & Epstein, J. L. (1993). Parents' attitudes and practices of involvement in inner-city elementary and middle schools. In N. Chavkin (Ed.), *Families and schools in a pluralistic society* (pp. 53-71). Albany, NY: State University of New York Press.
- Delgado-Gaitan, C. (1990). *Literacy for empowerment: The role of parents in children's education*. New York: Falmer.
- Demmert, W.G. (2001). *Improving academic performance among Native American students: A review of the research literature*. ERIC Digest. Charleston, WV: ERIC Clearinghouse on Rural Education and Small Schools. (ERIC Document Reproduction Service No. ED463 917)
- Demmert, W.G. & Towner, J.C. (2003). A review of the research literature on the influences of culturally based education on the academic performance of Native American students. Retrieved March 15, 2010 from [http://educationnorthwest.org/webfm\\_send/196](http://educationnorthwest.org/webfm_send/196)
- Downey, D. B. (2002). Parental and family involvement in education. In A. Molnar (Ed.), *School reform proposals: The research evidence*. Tempe, AZ: Education Policy Unit (EPRU), College of Education, Arizona State University.
- Epstein, J. L. (1992). School and family partnerships. In M. Alkin (Ed.), *Encyclopedia of educational research*. New York: Macmillan.
- Epstein, J. L. (1995). School/family/community partnerships: Caring for the children we share. *Phi Delta Kappan*, 76(9), 701-712.
- Epstein, J. L. (2001). *School, family, and community partnerships: Preparing educators and improving schools*. Boulder, CO: Westview Press.
- Epstein, J. L., & Dauber, S. L. (1991). School programs and teacher practices of parent involvement in inner-city elementary and middle schools. *The Elementary School Journal*, 91(3), 289-305.
- Epstein, J. L., Simon, B. S., & Salinas, K. C. (1997, September). Involving parents in homework in the middle grades. *Research Bulletin*, #18. Bloomington, IN: Phi Delta Kappa/Center for Evaluation, Development, and Research.
- Epstein, J. L., & Van Voorhis, F. L. (2001). More Than Minutes: Teachers' Roles in Designing Homework. *Educational Psychologist*, 36(3), 181-193.
- Epstein, J. L., Van Voorhis, F. L., & Salinas, K. C. (2000). *TIPS development guidelines*.

Baltimore: Center on School, Family, and Community Partnerships, Johns Hopkins University.

- Epstein, J., Salinas, K., & Van Voorhis, F. (2001). Teachers involve parents in schoolwork (TIPS) interactive homework for the middle grades. Center on School, Family, and Community Partnerships at Johns Hopkins University.
- Exec. Order No. 13336, 69 FR 25295 (2004), retrieved on February 17, 2010 from <http://edocket.access.gpo.gov/2004/pdf/04-10377.pdf> .
- Fehrmann, P. G., Keith, T. Z., & Reimers, T. M. (1987). Home influence on school learning: Direct and indirect effects of parental involvement on high school grades. *Journal of Educational Research*, 76(9), 330-337.
- Ferguson, C. (2008). *The school-family connection: Looking at the larger picture*. Austin, TX: Southwest Educational Development Lab.
- Funkhouser, J. E., & Gonzales, M. R. (1997). *Family involvement in children's education: Successful local approaches*. Retrieved May 15, 2008, from <http://www.ed.gov/pubs/FamInvolve/execsumm.html/>.
- Gajar, A. & Matuszny, R. M. (2002). A comparison of American Indian and non-American Indian parental involvement in the IEP process: Perceived needs for involvement and training. Washington, DC: Department of Education Office of Special Education Programs. (ED471948)
- Gill, S., & Reynolds, A. J. (1999). Educational expectations and school achievement of urban African-American children. *Journal of School Psychology*, 37, 403-424.
- Glick, J. E., & Hohmann-Marrott, B. (2007). Academic performance of young children in immigrant families: The significance of race, ethnicity, and national origins. *International Migration Review*, 41(2), 361-402.
- Gonzalez-DeHass, A. R., Willems, P. P., & Doan Holbein (2005). Examining the relationship between parental involvement and student motivation. *Educational Psychology Review*, 17(2), 96-123.
- Grolinick, W. S., Benjet, C., Kurowski, C. O., & Apostoleris, N. H. (1997). Predictors of parent involvement in children's schooling. *Journal of Educational Psychology*, 89(3), 538-48.
- Gutman, L. M. & Midgley, C. (2000). The role of protective factors in supporting the academic achievement of poor African American students during the middle school transition. *Journal of Youth and Adolescence*, 29(2), 223-249.
- Halle, T. G., Kurtz-Costes, B., & Mahoney, J. L. (1997). Family influences on school achievement in low-income, African-American children. *Journal of Educational Psychology*, 89, 527-537.

- Hardin Chamber of Commerce. (2010). City of Hardin: Local Information. Retrieved on March 1, 2010 from <http://www.tworiversauthority.org/Local.html>
- Haycock, K. (2001). Closing the achievement gap. *Educational Leadership*, 58(6), 6-11.
- Henderson, A. T., & Mapp, K. (2002). *A new wave of evidence: The impact of school, family, and community connections on student achievement, Annual synthesis, 2002*. Austin, TX: Southwest Educational Development Lab.
- Herzog, M.J.R & Pittman, R.B. (1995). *Home, family, and community: Ingredients in the rural education equation*. (Report No. RC-020-219). Cullowhee, NC: West Carolina University Department of Administration, Curriculum and Instruction. (ED388463)
- Ho, E. S., & Willms, J. D. (1996). Effects of parental involvement in eighth-grade achievement. *Sociology of Education*, 69, 126-141.
- Hoover-Dempsey, K. V., Bassler, O. C., Brissi, J. S. (1987). Contributions of teacher efficacy, school socioeconomic status, and other school characteristics. *American Educational Research Journal*, 24(3), 415-437.
- Hoover-Dempsey, K. V., Bassler, O. C., & Brissi, J. S. (1992). Explorations in parent-school relations. *Journal of Educational Research*, 85(5), 287-294.
- Hoover-Dempsey, K. V., Battiato, A. C., Walker, J. M. T., Reed, R. P., DeJong, J. M., & Jones, K. P. (2001). Parental involvement in homework. *Educational Psychologist*, 36, 195-209.
- Hoover-Dempsey, K. V., & Sandler, H. M. (1997). Why do parents become involved in their children's education? *Review of Educational Research*, 67, 3-42.
- Hoover-Dempsey, K. V., & Sandler, H. M. (2005). *The social context of parental involvement: a path to enhanced achievement*. Retrieved October 21, 2008, from <http://www.vanderbilt.edu/Peabody/family-school/index.html/>.
- Indian Nations At Risk Task Force (1991). *Indian nations at risk: An educational strategy for action*. Washington, D.C.: U.S. Department of Education.
- Ingram, M., Wolfe, R. B., & Lieberman, J. M. (2007). The role of parents in high-achieving schools serving low-income, at-risk populations. *Education and Urban Society*, 39(4), 479-497.
- Jeynes, W. H. (2003). A meta-analysis: The effects of parental involvement on minority children's academic achievement. *Education and Urban Society*, 35(2), 202-218.
- Jeynes, W. H. (2005). A meta-analysis of the relation of parental involvement to urban elementary school student academic achievement. *Urban Education*, 40(3), 237-269.

- Jimerson, L. (2003). *The competitive disadvantage: Teacher compensation in rural America*. Washington, DC: The Rural School & Community Trust.
- Johnson, J. & Strange, M. (2009). *Why rural matters 2009: State and regional challenges and opportunities*. Washington, DC: The Rural School & Community Trust. Retrieved on December 6, 2009 from [www.ruraledu.org/whyruralmatters](http://www.ruraledu.org/whyruralmatters) .
- Jones, R. (2001). How parents can support learning. *American School Board Journal*, 188(9), 18-22.
- Kaiser, A.P. & Delaney, E.M. (1996). The effects of poverty on teaching and learning. Retrieved on January 7, 2010 from <http://www.teach-nology.com/tutorials/teaching/poverty/6/>
- Keith, T.Z., Keith, P. B., Quirk, K.J., Cohen-Rosenthal, E., & Franzese, B. (1996). Effects of parental involvement on achievement of students who attend school in rural America. *Journal of Research in Rural Education*, 12(2), 55-67.
- Keith, T. Z., Keith, P. B., Troutman, G. C., Bickley, P. G., Trivette, P. S., & Singh, K. (1993). Does parental involvement affect eighth-grade student achievement? Structural analysis of national data. *School Psychology Review*, 22, 474-496.
- Kreider, H., Caspe, M., Kennedy, S., & Weiss, H. (2007). *Family involvement in middle and high school students' education*. Cambridge, MA: Harvard Family Research Project.
- Lareau, A. (1987). Social class differences in family-school relationships: The importance of cultural capital. *Sociology of Education*, 60(2), 73-85.
- Lazar, A., & Slostad, F. (1999). How to overcome obstacles to parent-teacher partnerships. *Clearing House*, 72(4), 206-210.
- Leveque, D. M. (1994). *Cultural and parental influences on achievement among Native American students in Barstow unified school district*. Paper presented at the meeting of the Comparative and International Educational Society, San Diego, CA: March. (ED382416)
- Lewis, A. (Ed.). (2001). *Add it up: Using research to improve education for low-income and minority students*: Poverty and Research Action Council.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications, Inc.
- Lipka, J. & Adams, B. (2004). Culturally based mathematics education as a way to improve Alaska Native students' mathematics. Athens, OH: Acclaim Research Initiative, Ohio Universtiy.

- Mackety, D. M., & Linder-VanBerschot, J. A. (2008). *Examining American Indian perspectives in the Central Region on parent involvement in children's education* (Issues & Answers Report, REL 2008-No. 059). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Educational Evaluation and Regional Assistance, Regional Laboratory Central. Retrieved October 21, 2008, from <http://ies.ed.gov/ncee/edlabs/>.
- Marchant, G. J., Paulson, S. E., & Rothlesberg, B. A. (2001). Relations of middle school students' perceptions of family and school contexts with academic achievement. *Psychology in the Schools, 38*, 505-519.
- Markward, M., & Klein, T. L. (2006). *Parent Involvement: Missouri Youth Initiative*.
- Marschall, M. (2006). Parent involvement and educational outcomes for Latino students. *Review of Policy Research, 23*(5), 1053-1076.
- Maxwell, J. A. (2005). *Qualitative research design: An interactive approach (2nd ed.)*. Thousand Oaks, CA: Sage.
- McCarty, T. L. (2002). *A place to be Navajo: Rough Rock and the struggle for self-determination in indigenous schooling*. Mahwah, NJ: Lawrence Erlbaum.
- McGrath, W. H. (2007). Ambivalent partners: Power, trust, and partnership in relationships between mothers and teachers in a full-time childcare center. *Teacher's College Review, 109*(6), 1401-1422.
- Montana Office of Public Instruction. (2009). *Data and reports*. Retrieved on December 6, 2009 from <http://opi.mt.gov> .
- Moses, R. P. (1994). Remarks on the struggle for citizenship and math/science literacy. *Journal of Mathematical Behavior, 13*(1), 107-111.
- Mueller, D. J. (1986). *Measuring social attitudes*. New York: MacMillan.
- Muhlenbruck, L., Cooper, H., Nye, B., & Lindsay, J. J. (2000). Homework and achievement: Explaining the different strengths of relation at the elementary and secondary school levels. *Social Psychology of Education, 3*, 295-317.
- National Mathematics Advisory Panel. (2008). *Foundations for success: The final report of the national mathematics advisory panel*. U.S. Department of Education: Washington, D.C.
- Nelson, K.G. (2006). Developing a professional learning community among mathematics teachers on two Montana Indian Reservations. Unpublished dissertation, Montana State University.
- Pantin, H., Coatsworth, J. D., Feaster, D. J., Newman, F. L., Briones, E., Prado, G., et al. (2003). *Familias unidas: The efficacy of an intervention to promote parental*

- investment in Hispanic immigrant families. *Prevention Science*, 4, 189-201.
- Paschal, R. A., Weinstein, T., & Walberg, H. J. (1984). The effects of homework in learning: A quantitative synthesis. *Educational Research*, 78, 97-104.
- Patton, M. Q. (2002). *Qualitative evaluation and research methods* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Pellino, K. M. (2007). *The effects of poverty on teaching and learning*. Retrieved on October 28, 2008, from <http://www.teach-nology.com/Articles/teaching/poverty/>.
- Pewewardy, C. (2002). Learning styles of American Indian/Alaska Native students: A review of the literature and implications for practice. *Journal of American Indian Education*, 41(3).
- Phillipson, S., & Phillipson, S. N. (2007). Academic expectations, beliefs of ability, and involvement by parents as predictors of child achievement: A cross-cultural comparison. *Educational Psychology*, 27(3), 329-348.
- Raffaele, L.M. & Knoff, H.M. (1999), Improving home-school collaboration with disadvantaged families: organizational principals, perspectives, and approaches. *School Psychology Review*, 28, 448-466.
- Rampey, B.D., Lutkus, A.D., and Weiner, A.W., (2006). *National Indian Education Study, Part I: The Performance of American Indian and Alaska Native Fourth- and Eighth-Grade Students on NAEP 2005 Reading and Mathematics Assessments* (NCES 2006-463). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. Washington, DC: Government Printing Office.
- Romero, M. E. (2004). Cultural literacy in the world of Pueblo children. In E. Gregory, S. Long, and D. Volk (Eds.), *Many pathways to literacy: young children learning with siblings, grandparents, peers, and communities*. New York: Routledge Falmer.
- Sanders, M. G., Epstein, J. L., & Connors-Tadros, L. (1999). *Family partnerships with high schools: The parent's perspective. Report 32*. Baltimore, MD: Johns Hopkins University Center for Research on the Education of Students Placed at Risk (CRESPAR).
- Schmitz, C., Wagner, J., & Menke, E. (2001). The interconnection of childhood poverty and homelessness: Negative impacts/points of access. *Families in Society*, 82(1), 69-71.
- Scott-Jones, D. (1994). Activities in the home that support student learning in the middle grades. In B. Rutherford (Ed.), *Creating family/school partnerships* (pp. 161-181). Columbus, OH: National Middle School Association.

- Shaver, A. V., & Walls, R. T. (1998). Effect of Title I parent involvement on student reading and mathematics achievement. *Journal of Research and Development in Education, 31*(2), 90-97.
- Sheldon, S. B. (2002). Parents' social networks and beliefs as predictors of parent involvement. *Elementary School Journal, 102*, 301-316.
- Sheldon, S. B. (2003). Linking school-family-community partnerships in urban elementary schools to student achievement in state tests. *The Urban Review, 35*, 149-165.
- Sheldon, S. B., & Epstein, J. L. (2005). Involvement counts: Family and community partnerships and mathematics achievement. *The Journal of Educational Research, 98*(4), 196-206.
- Sheldon, S. B. & Epstein, J. L. (2007a). *Parent survey of family and community involvement in the elementary and middle grades*. Baltimore: Johns Hopkins University, Center on School, Family, and Community Partnerships.
- Sheldon, S. B. & Epstein, J. L. (2007b). *Student survey of family and community involvement in the elementary and middle grades*. Baltimore: Johns Hopkins University, Center on School, Family, and Community Partnerships.
- Smrekar, C., & Cohen-Vogel, L. (2001). The voices of parents: Rethinking the intersection of family and school. *Peabody Journal of Education, 76*(2), 75-100.
- SPSS Inc., (1990). *SPSS Reference Guide*. Chicago: (author).
- Stenmark, J. K., Thompson, V., & Cossey, R. (1986). *Family math*. Berkley, CA: EQUALS, Lawrence Hall of Science, University of California at Berkley.
- Stern, J. D. (1994). *The condition of education in rural schools*. Washington, DC: U. S. Government Printing Office.
- Stevenson, D. L., & Baker, D. P. (1987). The family-school relation and the child's school performance. *Child Development, 58*, 1348-1357.
- Stewart, E. B. (2008). School structural characteristics, student effort, peer associations, and parental involvement: The influence of school- and individual-level factors on academic achievement. *Education and Urban Society, 40*(2), 179-204.
- Taylor-Cox, J., & Oberdorf, C. (2006). *Family math nights: Middle school math standards in action*. Larchmont, NY: Eye on Education, Inc.
- Thompson, V., & Mayfield-Ingram, K. (1998). *Family math: The middle school years*. Berkley, CA: EQUALS, Lawrence Hall of Science, University of California at Berkley.



- Thompson, V. & Kreinberg, N. (1986). FAMILY MATH: A report on an intervention program that involves parents in their children's mathematics education. Paper presented at the annual meeting of the American Association for the Advancement of Science. Philadelphia, PA. (ERIC Document Reproduction Service No. ED295837).
- U. S. Department of Education. (2006). *Poverty and students mathematics achievement*. Retrieved on October 28, 2008, from <http://nces.ed.gov/programs/coe/2006/section2/indicator15.asp/>.
- U. S. Department of Education. (2008). *Status and trends in the education of American Indians and Alaska Natives: 2008*. Retrieved on October 29, 2008, from <http://nces.ed.gov/pubs2008/nativetrends/index.asp/>.
- Van Voorhis, F. L. 2000. *The effects of TIPS interactive and non-interactive homework on science achievement and family involvement of middle grade students*. Unpublished doctoral dissertation, University of Florida, Gainesville.
- Van Voorhis, F. L. (2001). Interactive science homework: An experiment in home and school connections. *NASSP Bulletin*, 85(627).
- Van Voorhis, F. L., & Sheldon, S. B. (2004). Principals' roles in the development of U.S. programs of school, family, and community partnerships. *International Journal of Educational Research*, 41(1), 55-70.
- Walker, J. M., Hoover-Dempsey, K. V., Whetsel, D. R., & Green, C. L. (2004). *Parent involvement in homework: A review of current research and its implications for teachers, afterschool staff, and parent leaders*. Cambridge, MA: Harvard Family Research Project.
- Weiss, H. B., Mayer, E., Kreider, H., Vaughan, M., Dearing, E., Hencke, R., et al.. (2007). Making it work: Low-income working mothers' involvement in their children's education, digest version. *Family Involvement Research Digests*. Cambridge, MA: Harvard Family Research Project.
- Zhan, M. (2006). Assets, parental expectations and involvement, and children's educational performance. *Children and Youth Services Review*, 28(8), 961-975.

APPENDIX A:

PARENT SURVEY OF FAMILY AND COMMUNITY INVOLVEMENT

IN THE ELEMENTARY AND MIDDLE GRADES

### A. The School's Contact with You

- 1. How well has your child's teacher or someone at school done the following?**  
 Circle ONE answer on each line to tell if the school does this: Well (1), OK (2), Poorly (3), or Never (4).

	<b>Does this...</b>			
<b>My child's teacher or someone at the school...</b>	<b>Well</b>	<b>OK</b>	<b>Poorly</b>	<b>Never</b>
a. Helps me understand my child's stage of development.	1	2	3	4
b. Tells me how my child is doing in school.	1	2	3	4
c. Asks me to volunteer at the school.	1	2	3	4
d. Explains how to check my child's homework.	1	2	3	4
e. Sends home news about things happening at school.	1	2	3	4
f. Tells me what skills my child needs to learn in:	1	2	3	4
math;				
reading/language arts;	1	2	3	4
science.	1	2	3	4
g. Provides information on community services that I may want to use with my family.	1	2	3	4
h. Invites me to PASS or family math activities.	1	2	3	4
i. Assigns homework that requires my child to talk with me about things learned in class.	1	2	3	4

j. Invites me to a program at the school.	1	2	3	4
k. Has a parent-teacher conference with me.	1	2	3	4
l. Provides information on community events that I may want to attend with my child.	1	2	3	4

**2. How much do you agree or disagree with the following statements about your child's school and teachers?** Circle ONE answer on each line to tell if you Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).

	Strongly Agree	Agree	Dis-agree	Strongly Disagree
a. This is a very good school.	1	2	3	4
b. I feel welcome at the school.	1	2	3	4
c. I get along well with my child's teacher(s).	1	2	3	4
d. The teachers at this school care about my child.	1	2	3	4

### B. Your Involvement

**3. Families are involved in different ways at school and at home. How often do you do the following activities?** Circle ONE answer on each line to tell if this happens: Everyday or Most Days (1), Once a Week (2), Once in a While (3), or Never (4).

How often do you...	Everyday /Most Days	Once a Week	Once in a While	Never
a. Read with your child?	1	2	3	4
b. Volunteer in the classroom or at the school?	1	2	3	4
c. Work with your child on science homework?	1	2	3	4
d. Review and discuss the schoolwork your child brings home?	1	2	3	4

e. Help your child with math?	1	2	3	4
f. Visit your child's school?	1	2	3	4
g. Go over spelling or vocabulary with your child?	1	2	3	4
h. Ask your child about what he/she is learning in science?	1	2	3	4
i. Talk to your child's teacher?	1	2	3	4
j. Ask your child about what he/she is learning in math?	1	2	3	4
k. Help your child with math homework?	1	2	3	4
l. Help your child understand what he/she is learning in math?	1	2	3	4
m. Help your child prepare for math tests?	1	2	3	4
n. Ask your child how well he/she is doing in school?	1	2	3	4
o. Ask your child to read something he/she wrote?	1	2	3	4
p. Go to a school event (e.g., sports, music) or meeting?	1	2	3	4
q. Check to see if your child finished his/her homework?	1	2	3	4

### C. Your Ideas

- 4. How much do you agree or disagree with the following statements about what parents should do? Circle ONE answer on each line to tell if you Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).**

<b>It is a parent's responsibility to...</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
a. Make sure that their child learns at school.	1	2	3	4
b. Teach their child to value schoolwork.	1	2	3	4
c. Show their child how to use things like a dictionary or encyclopedia.	1	2	3	4
d. Contact the teacher as soon as academic problems arise.		2	3	4
e. Test their child on subjects taught in school.	1	2	3	4
f. Keep track of their child's progress in school.	1	2	3	4
g. Contact the teacher if they think their child is struggling in school.	1	2	3	4
h. Show an interest in their child's schoolwork.	1	2	3	4
i. Help their child understand homework.	1	2	3	4
j. Know if their child is having trouble in school.	1	2	3	4

**5. How much do you agree or disagree with the following statements?**

**Circle ONE** answer on each line to tell if you Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Dis-agree</b>	<b>Strongly Disagree</b>
a. I know how to help my child do well in school.	1	2	3	4
b. I never know if I'm getting through to my child.	1	2	3	4
c. I know how to help my child make good grades in school.	1	2	3	4
d. I can motivate my child to do well in school.	1	2	3	4
e. I feel good about my efforts to help my child learn.	1	2	3	4
f. I don't know how to help my child on schoolwork.	1	2	3	4
g. My efforts to help my child learn are successful.	1	2	3	4
h. I make a difference in my child's school performance.	1	2	3	4

**6. How often do you talk with parents who have children at your child's school about the topics listed below? Circle ONE answer on each line to tell if this happens: Very often (1), Once in a while (2), A few times a year (3), or Never (4).**

<b>How often do you and parents at your child's school . .</b>	<b>Very Often</b>	<b>Once in a while</b>	<b>A few times a year</b>	<b>Never</b>
a. Talk about activities at your children's school?	1	2	3	4
b. Talk about your children's teacher(s)?	1	2	3	4
c. Provide each other advice about parenting?	1	2	3	4
d. Share helpful information about your child's: reading/language arts?	1	2	3	4
math?	1	2	3	4
science?	1	2	3	4
e. Share books or book titles to read with your children?	1	2	3	4
f. Talk about your children's behavior or misbehavior?	1	2	3	4
g. Talk about where to send your children to school?	1	2	3	4
h. Share information about community events (e.g., museum exhibits, library readings, and children's theater)?	1	2	3	4
i. Talk about the school's policies and rules?	1	2	3	4
j. Share information about extra-curricular activities?	1	2	3	4
k. Talk about how to become involved at the school?	1	2	3	4
l. Share games, or the names of games, to play with your children?	1	2	3	4



m. Talk about how your children are changing (e.g., growth spurts, boyfriends/girlfriends, social or emotional changes)?	1	2	3	4
n. Provide each other with advice about helping your child with homework?	1	2	3	4
o. Talk about your children's accomplishments in school?	1	2	3	4

**D. YOUR FAMILY**

**10. The following questions will help us plan programs and activities to meet your family's needs. Please mark one answer for each item.**

**a. Is your child at this school a:** \_\_\_\_\_ Girl \_\_\_\_\_ Boy

**b. When was your child born:** \_\_\_\_\_ Month \_\_\_\_\_ Year

**c. What is your relationship to the child?**

- |                  |                               |
|------------------|-------------------------------|
| _____ Mother     | _____ Grandmother             |
| _____ Father     | _____ Grandfather             |
| _____ Stepmother | _____ Other (please describe) |
| _____ Stepfather | _____                         |

<p><b>d. How much formal schooling have you completed?</b></p> <p>_____ Some high school</p> <p>_____ High school diploma</p> <p>_____ Some college</p> <p>_____ Vocational school/Technical college</p> <p>_____ College degree</p> <p>_____ Graduate degree or credits</p>	<p><b>e. How much schooling do you think your child will complete?</b></p> <p>_____ Some high school</p> <p>_____ High school diploma</p> <p>_____ Some college</p> <p>_____ Vocational school/Technical college</p> <p>_____ College degree</p> <p>_____ Graduate degree</p>
--	---

<p><b>f. How do you describe yourself?</b></p> <p><input type="checkbox"/> Native American (tribe) _____</p> <p><input type="checkbox"/> White or Caucasian</p> <p><input type="checkbox"/> Hispanic or Latino(a)</p> <p><input type="checkbox"/> Other (describe) _____</p>	<p><b>g. What language do you speak at home?</b></p> <p><input type="checkbox"/> English</p> <p><input type="checkbox"/> Spanish</p> <p><input type="checkbox"/> Crow</p> <p><input type="checkbox"/> Cheyenne</p> <p><input type="checkbox"/> Other (describe) _____</p>
--	---

**h. Marital Status:**

Married       Divorced or separated       Never married

**i. Are you employed?**

Full-time       Part-time       Not employed

**j. If applicable, is your spouse or partner employed?**

Full-time     Part-time     Not employed     Not applicable

**11. What other suggestions do you have about how the school could help you support your child's education or learning?**

APPENDIX B:

PARENT SURVEY SCALES AND RELIABILITY COEFFICIENTS

Question	Subscale	Number of Items	Sample Size (parents)	Cronbach's Alpha
<b><i>The School's Contact with You</i></b> <b>1. How well has your child's teacher or someone at school done the following?</b> Well (1), OK (2), Poorly (3), or Never (4).	Invitations to school	5	395	.841
	Communicates information about child's progress	5	376	.873
	Encourages parent-child interactions on homework	2	386	.649
	Connects with community	2	407	.737
<b><i>School Climate</i></b> <b>2. How much do you agree or disagree with the following statements about your child's school and teachers?</b> Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).		4	399	.882
<b><i>Parental Involvement</i></b> <b>3. Families are involved in different ways at school and at home. How often do YOU do the following activities? How often do you ...</b> Every day or Most Days (1). Once a Week (2), Once in a While (3), or Never (4).	Parent involvement at school	4	404	.763
	Parent involvement at home	10	392	.897
	Parent involvement in reading/ LA	4	407	.761
	Parent involvement in mathematics	3	412	.822
	Parent involvement in science	3	406	.814
	Monitoring Schoolwork	3	408	.721

<p><i>Parental Role Construction</i>  <b>4. How much do you agree or disagree with the following statements about what parents should do? It is a parent's responsibility to ...</b>  Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).</p>		10	396	.882
<p><i>Parental Efficacy</i>  <b>5. How much do you agree or disagree with the following statements?</b>  Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).</p>		8	384	.822
<p><i>Parents' Social Networks</i>  <b>6. Sometimes parents talk with other parents about their children's education. Please think of up to five parents who have children in your child's school. Circle the number that best describes how often you talk to each parent. Refer to one person on each line. If you do not speak with any other parents at your child's school, check this box. Give first names only.</b>  Open-ended questions</p>	How often do you talk?	5		
	Please list some of the things you talk about with these parents	4		
<p><i>Parents' Social Networks</i>  <b>7. Please think of up to five adults (who do not have children in your child's school) with whom you talk about your child and his/her education. Refer to one person per line. If you do not speak with any other adults, please check this box. Five first names only.</b></p>	Do you speak with this person often?	5		
	Is this person a relative?	5		

Open-ended questions				
	Does this person have a child at a different school?	5		
	Please list some of the things you talk about with these adults	4		
<i>Topics of Conversation with Other Parents</i> <b>8. How often do you talk with parents who have children at your child's school about the topics listed below? How often do you and other parents ...</b> Very often (1), Once in a While (2), A few times a year (3), or Never (4).		17	355	.962
<i>Parental Connections</i> <b>9. How have your connections with other parents helped you the most as a parent?</b> Open-ended question		1		
<i>Your Family</i> <b>10. The following questions will help us plan programs and activities to meet your family's needs. Please mark one answer for each item.</b> Demographics		10		
<i>Your Family</i> <b>11. What other suggestions do you have about how the school could help you support your child's education or learning?</b>		1		

APPENDIX C:

FAME PARENT SURVEY SCALES AND RELIABILITY COEFFICIENTS

Question	Number of Items	Sample Size (parents)	Cronbach's Alpha
<p><b><i>The School's Contact with You</i></b></p> <p><b>1. How well has your child's teacher or someone at school done the following?</b> Well (1), OK (2), Poorly (3), or Never (4).</p>	14	192	.783
<p><b><i>School Climate</i></b></p> <p><b>2. How much do you agree or disagree with the following statements about your child's school and teachers?</b> Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).</p>	4	192	.872
<p><b><i>Parental Involvement</i></b></p> <p><b>3. Families are involved in different ways at school and at home. How often do YOU do the following activities?</b> <b>How often do you ...</b> Every day or Most Days (1). Once a Week (2), Once in a While (3), or Never (4).</p>	17	192	.806
<p><b><i>Parental Role Construction</i></b></p> <p><b>4. How much do you agree or disagree with the following statements about what parents should do?</b> <b>It is a parent's responsibility to ...</b> Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).</p>	10	192	.910
<p><b><i>Parental Efficacy</i></b></p> <p><b>5. How much do you agree or disagree with the following statements?</b> Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).</p>	8	192	.732



APPENDIX D:  
STUDENT QUESTIONNAIRE

**A. Your Ideas****1. How much do you agree or disagree with the following statements?**

Circle ONE answer on each line to tell if you Strongly Agree (SA), Agree (A), Disagree (D), or Strongly Disagree (SD).

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Dis-agree</b>	<b>Strongly Disagree</b>
a. I am good at my schoolwork.	SA	A	D	SD
b. There is someone at this school I can talk to if I have a problem.	SA	A	D	SD
c. I remember things easily.	SA	A	D	SD
d. People at this school are friendly to me.	SA	A	D	SD
e. I am just as smart as other kids my age.	SA	A	D	SD
f. I feel like a part of this school.	SA	A	D	SD
g. I can do the work in my classes.	SA	A	D	SD
h. Sometimes I feel like I don't belong at this school.	SA	A	D	SD
i. We do many things in school that I can do well.	SA	A	D	SD
j. I wish I were in a different school.	SA	A	D	SD

**B. You and Your Family****2. How much do you agree or disagree with the following statements?**

Circle ONE answer on each line to tell if you Strongly Agree (SA), Agree (A), Disagree (D), or Strongly Disagree (SD).

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Dis-agree</b>	<b>Strongly Disagree</b>
a. I enjoy having my parent help me with schoolwork.	SA	A	D	SD
b. I like to talk with my parent about school.	SA	A	D	SD
c. I like having homework that asks me to talk with someone at home.	SA	A	D	SD

**3. Families do different things together. How often is your parent or guardian involved with you in the following ways?**

Circle ONE answer on each line to tell if this happens Every day or Most Days (1), Once a Week (2), Once in a While (3), or Never (4).

<b>How often does a parent...</b>	<b>Everyday /Most Days</b>	<b>Once a Week</b>	<b>Once in a While</b>	<b>Never</b>
a. Watch or talk about television with you?	1	2	3	4
b. Read with you?	1	2	3	4
c. Volunteer in the classroom or at your school?	1	2	3	4
d. Work with you on science projects or science homework?	1	2	3	4
e. Review and discuss the schoolwork you bring home?	1	2	3	4
f. Help you with math homework?	1	2	3	4
g. Visit your school?	1	2	3	4
h. Go over spelling or vocabulary with you?	1	2	3	4
i. Ask you about what you are learning in science?	1	2	3	4
j. Talk with your teacher?	1	2	3	4
k. Ask you about what you are learning in math?	1	2	3	4
l. Help you with math homework?	1	2	3	4
m. Help you understand what you are learning in math?	1	2	3	4
n. Help you prepare for math tests?	1	2	3	4
o. Ask you how well you are doing in school?	1	2	3	4
p. Ask you to read something you wrote?	1	2	3	4
q. Go to a school event or meeting (e.g., sports, music, drama, PTA)?	1	2	3	4
r. Make sure all of your homework is done?	1	2	3	4



e. How many adults live at home with you?      0    1    2    3    4    5+

f. How far do you think you will go in school? (Check one)

- \_\_\_\_\_ Some high school  
 \_\_\_\_\_ Complete high school.  
 \_\_\_\_\_ Some college  
 \_\_\_\_\_ College degree  
 \_\_\_\_\_ More than college (e.g., doctor, lawyer)

<p><b>g. How do you describe yourself?</b></p> <p>_____ American Indian          (tribe)          _____          _____ White or Caucasian          _____ Hispanic or Latino(a)          _____ Other (please list):          _____</p>	<p><b>h. Which language does your family usually speak at home?</b></p> <p>_____ English          _____ Spanish          _____ Crow          _____ Cheyenne          _____ Other (please list):          _____</p>
---	--

i. Which of the following items do you have at home? (Check all that apply)

<p>_____ Telephone          _____ Television          _____ Cable TV          _____ Daily newspaper          _____ Computer</p>	<p>_____ Calculator          _____ VCR or DVD player          _____ 50 or more books          _____ A quiet place to study</p>
---	--

j. About how much homework do you do each night? (check one)

- \_\_\_\_\_ None  
 \_\_\_\_\_ About 15 minutes  
 \_\_\_\_\_ About 30 minutes  
 \_\_\_\_\_ About 45 minutes  
 \_\_\_\_\_ About one hour  
 \_\_\_\_\_ More than one hour

**THANK YOU FOR YOUR HELP!**

© Sheldon, S. B. & Epstein, J. L. (2007). *Student survey of family and community involvement in the elementary and middle grades*. Baltimore: Johns Hopkins University, Center on School, Family, and Community Partnerships.

APPENDIX E:

STUDENT SURVEY SCALES AND RELIABILITY COEFFICIENTS

Question	Subscale	Number of Items	Sample Size (students)	Cronbach's Alpha
<b><i>Student Motivation and Attitudes</i></b> <b>1. How much do you agree with the following statements?</b> Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).	Self-competence	5	971	.753
	Sense of Belonging	5	930	.681
<b><i>Views of Parent Involvement</i></b> <b>2. How much do you agree or disagree with the following statements?</b> Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).		3	967	.806
<b><i>Parent Involvement</i></b> <b>3. Families do different things together. How often is your parent or guardian involved with you in the following ways? How often does a parent ...</b> Everyday or Most Days (1), Once a Week (2), Once in a While (3), or Never (4).	Parent Involvement at School	4	935	.710
	Parental Monitoring Schoolwork at Home	3	975	.697
	Parental Involvement in Reading	4	956	.800
	Parental Involvement in Math	3	956	.830
	Parental Involvement in Science	3	967	.768
<b><i>School and Family Connections</i></b> <b>4. How much do you agree with the following statements?</b> Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).	Welcoming Climate	5	924	.745
	Encouraging Interactions on homework	3	962	.833



<p><i>School and Family Connections</i></p> <p><b>5. How much do you agree with the following statements?</b> Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).</p>		2		
<p><i>About You and Your Family</i></p> <p><b>6. Please fill in your information for each question.</b></p> <p>Demographics</p>		10		
<p><i>About You and Your Family</i></p> <p><b>7. Please describe a school activity that involves your parent that is useful or enjoyable for you.</b></p> <p>Open-ended</p>		1		

APPENDIX F:

FAME STUDENT SURVEY SCALES AND RELIABILITY COEFFICIENTS

Question	Number of Items	Sample Size (students)	Cronbach's Alpha
<p><i>Student Motivation and Attitudes</i></p> <p><b>1. How much do you agree with the following statements?</b> Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).</p>	10	120	.419
<p><i>Views of Parent Involvement</i></p> <p><b>2. How much do you agree or disagree with the following statements?</b> Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).</p>	4	120	.747
<p><i>Parent Involvement</i></p> <p><b>3. Families do different things together. How often is your parent or guardian involved with you in the following ways? How often does a parent ...</b> Everyday or Most Days (1), Once a Week (2), Once in a While (3), or Never (4).</p>	17	120	.889
<p><i>School and Family Connections</i></p> <p><b>4. How much do you agree with the following statements?</b> Strongly Agree (1), Agree (2), Disagree (3), or Strongly Disagree (4).</p>	10	120	.749

APPENDIX G:

FAMILY INTERVIEW PROTOCOL

As you know, I am conducting a study to document the process of implementing the Families Achieving Mathematical Excellence (FAME) program, and to learn how to make the program as beneficial as possible for students and their families. I would like to speak with you about your experiences with the FAME program, and to ask for your recommendations for similar programs in the future.

*Why Families Get Involved*

1. Can you tell me what made you decide to attend your first FAME event? What do you recall from the first event(s) you attended? *Probe: What do you remember as being most important or memorable?*

Why did you (or didn't you) continue to participate in the program? What more can programs like FAME do to encourage parents and family members to attend at first, or to continue participating?

2. In what ways, if any, did you feel a sense of welcome at the events? What about the events, the staff or people there made you feel welcome or unwelcome?

*Probe: What aspects of the events made you feel comfortable or uncomfortable at the first events you attended? If you continued to attend, what aspects made you feel comfortable or not?*

Did this affect your decision to continue with the program? What more can programs like FAME do so that family members feel welcome and comfortable when they attend?

*Academic Success*

Do you feel the FAME program helped your family connect with mathematics in a way that helped your child be more successful in mathematics? Please describe this connection.

*Structure of FAME events to promote learning and engagement*

1. What FAME event(s) did you learn from or enjoy the most? *Probe: What made these event(s) particularly good learning opportunities or enjoyable for you?*

2. What FAME events did your student learn from or enjoy the most?

*Probe: What made these event(s) particularly good learning opportunities or enjoyable for your student?*

3. What FAME events did you learn less from or enjoy less? What about these events made them less effective learning experiences or less enjoyable?

4. In general, how could FAME events be improved upon?

*Family Support Outside of School*

1. How did the FAME events influence your support of your child's mathematics learning outside of school?

*Probe: Did you talk about mathematics more often? Did you assist with homework more?*

2. How did the FAME program support your ability to discuss your child's mathematics learning with the teacher or school? *Probe: Were you able to more easily discuss your child's progress in mathematics at parent/teacher conferences? Did you contact the teacher more often?*

*General Information*

1. Do you have any stories or other information about the FAME program you would like to share with me?

2. Can you think of any other programs the district could offer to help you be more involved in your child's education in mathematics or other subject areas? What would the programs be?

3. How do you see your role in your child's education? Did the FAME program change this view in any way?

4. How do you feel you have benefited personally as a result of participating in FAME?

APPENDIX H:

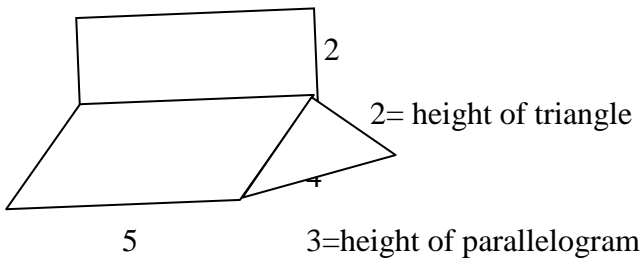
SAMPLE TIPS HOMEWORK ASSIGNMENT

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**TIPS: Area of Irregular Shapes**

Dear Family Partner:  
 In math, we are \_\_\_\_\_. I hope you enjoy this activity with me. This assignment is due \_\_\_\_\_.  
 Sincerely,  
 \_\_\_\_\_  
 Student's signature

**I. LOOK THIS OVER:** Explain this example to your family partner. Sometimes you can use area formulas you know to help you find the area of other figures. To find the area of the figure below, first divide the figure into figures you know. The figure is made up of a triangle, a parallelogram, and a rectangle. Next, find the area of each figure. Then, add.



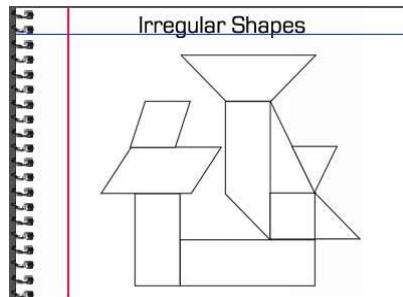
rectangle =  $2 \times 5 = 10$

parallelogram =  $3 \times 5 = 15$

triangle =  $.5 \times 2 \times 4 = 4$

Area =  $10+15+4=29$

**Complete these examples on your own. Show your work. Explain one example to your family partner.**

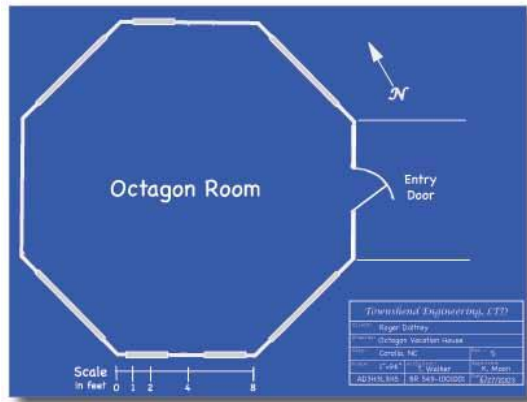




Create a design with the shapes on the attached page. The design should have no overlaps or gaps; in other words, sides should touch to form an irregular figure. You may cut them apart or trace them. With your family partner, discuss the process of determining the area of each shape and then adding the areas. Then, calculate the area of each shape and record it directly on each shape, and then determine the total area of your figure by adding the area of all shapes that comprise their design.



Our principal wants to know how much carpet (or how many floor tiles) would be needed to cover the entire floor of the room below. He needs to know the exact area, because he doesn't want to order too much carpet and waste money, and he doesn't want to order too little and not be able to cover the entire floor. Your job is to measure this room, determine the area of the floor, and write a short letter to the principal telling him how much carpet to buy and how you arrived at your estimate.



Dear Family Partner,

Please give me your reactions to your child's work on this activity. Write YES or NO for each statement.

- \_\_\_\_\_ 1. My child understood the homework and was able to complete it.
- \_\_\_\_\_ 2. My child and I enjoyed the activity.
- \_\_\_\_\_ 3. This assignment helped me know what my child is learning in math.

Any other comments: \_\_\_\_\_

Family Partner signature: \_\_\_\_\_

*Epstein, J.L., Salinas, K.C., & Van Voorhis, F.E. (2000, revised). Teachers Involve Parents in Schoolwork (TIPS) Interactive Homework for the Middle Grades. Baltimore: Center on School, Family, and Community Partnerships, Johns Hopkins University.*