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Parental ability to support their children's education of mathematics

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PARENTAL ABILITY TO SUPPORT THEIR CHILDREN'S EDUCATION OF MATHEMATICS

by
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ABSTRACT

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Parental Ability to Support their Children's Education of Mathematics
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The purpose of this study is to determine the extent to which parents/guardians can adequately support the success of their children's innovative mathematics curriculum. The study raises questions about the skills and knowledge parents have about today's mathematical practices. Are parents informed enough to sufficiently support their children's mathematical achievement? A qualitative review will take place by collecting student perception surveys, parent perception surveys, parent interviews, and a teacher journal recording home-school communication. This study is concerned with how teachers at Webster Elementary School will better be able to foster an environment where the mathematics needs of parents and children are met to further student achievement.

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Chapter 1

Statement of the Problem

"The first teachers are the parents, both by example and conversation."

Lamar Alexander

A new vision of mathematics instruction has emerged in the United States of America subsequent to the "Nation at Risk" declaration that is distant from traditional procedures. The proposed pedagogy emphasizes the collaborative effort of students in collecting data and solving real-life problems to discover patterns and correlations in mathematics. While using this problem solving methodology, teachers are able to guide by close analysis of student thinking, support appropriate problem solving techniques, encourage mathematical discussions, and guide towards conceptualization of important issues. Curriculum and instruction are inextricably linked, in that the circumstances under which students learn affect what they learn (Connected Mathematics, Overview ¶ 11). Accordingly, in this educational reform what is the role of the adults within the child's home environment who affect circumstance and learning?

One of the most widely held beliefs in education is that parents[1] are fundamental for the academic accomplishment of their children. Steven B. Sheldon (2003, 150) sites numerous studies supporting the belief that all parents should actively participate in their

[1] Throughout the document there are a number of references to "parents" or "parent" involvement. All such references signify the adults who play an important role in a child's family life, such as guardians, grandparents, aunts, uncles, stepparents, etc. These adults may carry the principal responsibility for a child's education, development, and welfare in some families.

children's education to obtain higher academic achievement. To negate common myths, the best predictor of student accomplishment in school is not family income or social status, but active parental involvement. Barber, Parizeau, and Bergman (8) assert that the best forecast of student success is a home environment that encourages learning, high (but not unrealistic) expectations by parents, and involvement of parents in children's education at school and in the community.

Homework is an opportunity for children to learn and for families to be involved with their children's education. However, helping children is not always trouble-free. Jeanne Mills (Science, Mathematics, and Environmental Mathematics, 1989) designed a seminar to engage third grade parents in the math homework process. Results of the parent evaluation shows that parents who learned the value of math homework began to accept more responsibility for encouraging their child to complete work at home. Through this parental participation effort, forty-one out of fifty-one students increased their rate of reliable homework return, which resulted in higher achievement in math test scores and overall content grades.

This study will concentrate on a variety of different research questions in attempt to recognize the understandings and efforts of parents in their child's mathematics curriculum. To what extent can parents/guardians adequately support the mathematics achievement of their child? What kind of strategies do parents implement to assist in homework and meet the needs of their child? What are the parental concerns of contemporary mathematics reform?

To determine the answers of these important questions, a greater awareness of the subject is essential by reviewing the relevant literature on mathematical reform,

groundbreaking curriculums, and the importance of parental involvement on student achievement. For the focus of this research study is to determine the extent to which parents/guardians can adequately support the success of their children's innovative mathematical education. The hypothesis being tested in this study states, parents/guardians skills and knowledge of today's mathematical practices insufficiently support their children's mathematical achievement. A qualitative review will take place by collecting four forms of data to meet the objective of this study. The four forms of data collection are: (1) student perceptions surveys, (2) parent/guardian perception surveys, (3) parent/guardian interviews, and (4) a teacher journal recording home-school communication. If the research verifies the study's hypothesis, teachers will be better able to foster an environment where the mathematic needs of parents and children are met to further student achievement.

The research study will be conducted at Webster Elementary School[2], which is located in middle class, suburban neighborhood of Southern New Jersey. With an average family size of 3.14, the ethnicity of the persons living in this district are 95.8% White, 2.1% Black and 1.3% Hispanic. 80.4% of the persons living in this neighborhood have a high school degree or higher, whereas only 24.4% have a Bachelor degree or higher education.

The participants of this study will include thirty-four sixth grade students ranging in age from 11 years to 13 years in the Clinical Internship II placement assigned to the principal investigator. The student participant's mathematical achievements range from basic skills to mathematics enrichment. The parents of the involved students will also be

[2] Webster Elementary School is a pseudonym; the actual school where the study was conducted will not be disclosed.

asked to contribute to the study on a voluntary basis. All subjects recruited are voluntary and must return a permission slip granting permission to participate.

There are many limitations to the study since it is based on volunteerism. The participants may only volunteer because they are confident of their achievements. Furthermore, the volunteer participants come from significantly similar backgrounds, being white and middle class. Another limitation is the relatively small sample and the late time of year when the study occured, in which significant concerns of parents and students may have subsided. A final restriction is the qualitative data analysis, which allows for varying interpretations.

The research is organized beginning with a review of literature on mathematics reform, innovative curriculums, parental involvement, student achievement, and homework. The methodology will follow, consisting of information pertaining to the studies context, participants, materials, and procedures. Next, the results of the study will be presented through a data analysis. As a final point, the study will conclude with a summary of results through a discussion of findings.

Chapter 2

Review of Relevant Literature

For all the controversy in field of educational practices, Barber, et al. synthesized the agreeing research studies about how students of all ages and abilities learn best to one straightforward list. The following are the key factors and brief descriptions of Barber's record.

- "Active" learning is most effective. Through direct interaction of materials and ideas, children have a better opportunity to understand and retain knowledge longer.
- Understanding goes beyond vocabulary. True understanding is a greater depth than rote memorization, and it takes more time. The deeper approach enables children to explain and make sense of concepts.
- There are recognized phases of learning. Students need a chance to investigate ideas, develop questions, receive information, and apply the new information to various situations for themselves.
- Learners of different ages have different needs. Different ages call for distinctive experiences, however, all learners need to interact directly with materials.
- A variety of learning experiences is best. A variety of teaching strategies enable the students to receive a "balance diet" of experiences to provide for learning experiences and understanding.

Barber's fusion of optimal learning practices establishes the desire for teachers to actively engage students of different needs in a deeper level of understanding through the proper sequencing of activities and teaching strategies. Additionally, this list of research concepts develops the context for educational reform in mathematics. However, the pendulum of education reform has swung back and forth numerous times. The continuing debate is whether or not students should be taught through a problem solving or basis math skills curriculum, and the importance of rote memorization of math facts.

Education reform gained prominent status in 1983, when the National Commission of Excellence in Education, issued the report entitled *A Nation at Risk: The Imperative for Educational Reform.* The report claimed, "the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and as a people"(Barber et. al., 2002). In 1989, George Bush and the state governors adopted six goals for public education reform, which initiated the movement in many states to improve the growth and development for all learners (Okpala, Okpala, Smith, and Fredrick, ¶ 8). Subsequently, the publication of the Curriculum and Evaluation Standards for School Mathematics challenged to move instruction away from the traditional "telling" format. The mathematics reform movement's objective is to educate children, rather than train them. Traditional strategies are "viewed as discrete, hierarchical, sequential, and fixed" (Draper, ¶ 8). Most recently, in September of 2000, a commission led by Senator John Glenn published a summary of key issues in mathematics and science education labeled *Before It's Too Late* to reaffirm the need for reform (Barber et. al., 12).

The participation and achievement rate in mathematics education in the United States has not been on level of satisfaction. Howe and Warren (1998) have validated this opinion, due to the little improvement in the averages of the Scholastic Aptitude Test, and fewer than fifty percent of high school students take more than one mathematics course, unless it is mandatory. As a result of this confirmation, concerned adults within the United States are demanding higher student achievement and changes in curriculum. To manage this demand, Howe and Warren developed nine standards for accountability and improvement in a good mathematics program.

> "A good mathematics program accountability and improvement program should (1) develop a process that involves teachers, administrators, parents, students and other citizens; (2) establish desirable goals and objectives for the mathematics program; (3) select indicators to determine alignment of the curriculum, curriculum and instructional resources, instruction and instructional climate, program expectations and support, and student achievement and participation; (4) provide for analyzing the data obtained to determine achievement and participation levels and to identify variables related to program successes and weaknesses; (5) communicate results to the school and public; (6) determine changes desired; (7) establish policies, procedures, and practices to implement changes; (8) continuously monitor the program; and (9) provide mechanisms to reward success."

The new tendency of reform has many mathematics educators appealing for teachers to move away from teaching by telling toward a more constructivist approach. In hopes to challenge the routines and beliefs of conventional curriculums, the

mathematics reform movement encourages students to gain significant, lasting, and functional mathematics knowledge. The request is for a more student-centered math classroom to emphasize problem solving and communication for use in their everyday lives, which is very different from the traditional approach of rote memorization of basic math skills. However, the traditional approach to instruction enables teachers to attain an immediate sense of significance in the customary practices of teaching. As stated in Draper, Smith recognized a way to create an awareness of efficacy by "(a) defining a manageable mathematical content that they have studied extensively and (b) providing clear prescriptions for what they must do with that content to affect student learning" (¶ 10). Therefore, to establish an effective practice, the needs of the students and teachers need to be met.

Nevertheless, the constructivism theory[3] presents a framework to help math teachers move from a "telling" model to one in which students and teachers together can solve problems, engage in investigations, and construct knowledge. This theory cannot evolve into practice on it's own. Constructivism places the role of the teacher as an associate to assist students as they create constructions. Gallimore and Tharp describe six ways teachers assist in student performance: "modeling, contingency, managing, feeding back, instructing, questioning, and cognitive structuring" (Draper, ¶ 16). The significant variety of teaching strategies allows for children to learn to question, explore, and contemplate, therefore creating a greater mathematical resonance.

The mathematics crisis in education has created a reform effort to focus on the development of new curricula, teacher enhancement, and the use of emergent technology.

[3] Dewey recognizes the constructivism theory in that the experience, environment, and language play fundamental roles in the knowledge acquisition of students (1938/1997).

Thomas Edwards organized a simplified list to recognize the extensive and diverse programs implemented nationwide to overcome the impending crisis in mathematical education. To follow is a contracted list of reform efforts to enhance curriculum, teacher practices, and technological use:

- *Mathematics in Context* is a comprehensive middle grades program that reflects the content and pedagogy of the National Council of Teachers of Mathematics (NCTM) standards.
- *Quantitative Reasoning Project* investigates the development of students' algebraic reasoning by emphasizing quantitative reasoning in the areas of students' cognitions, teachers' cognitions, and materials development.
- *Teaching the Big Ideas* is a four-year professional development project focusing their effort on organizing central mathematics principles.
- *Cognitively Guided Instruction* is a workshop in which teachers synthesize research findings to construct a mathematical learning environment consistent with their personal teaching style, knowledge, beliefs, and students.

The two most significant educational reforms in the southern New Jersey school systems and the curriculum focus of this study are the *Connected Mathematics Project* (CMP) and *Everyday Mathematics*. Both of these reform programs challenge students to solve problems by observing patterns and relationships, thereby enhancing their understanding of mathematics. The role of the teacher's is to guide the students to their own discovery of patterns and concepts. Judith Cain claims these programs deepen understanding "from problem to problem within a unit, from one strand to another, and from unit to unit within the entire curriculum, these mathematical ideas are connected to

each other and to the students' real world outside of school" (¶ 5). No longer are arithmetic skills only being taught. The focus is much broader.

The University of Chicago School of Mathematics Project developed *Everyday Mathematics*, a research-based curriculum for kindergarten through sixth grade students. The overwhelming goal of the project team is to significantly improve mathematics curriculum and instruction to meet the needs of all learners in the United States. The project's three basic principles to meet that goal are: (1) for students to acquire knowledge and skills, and develop an understanding of mathematics from personal experiences, (2) students should gradually gain understanding of abstract concepts by building upon an intuitive and concrete foundation, and (3) teachers and their instruction are the key element of success. Understanding these principles allowed for the author team to develop the curriculum one grade at a time in three-year development cycles. This strategic development allows for "consistent high quality, and a sequence of instruction that carefully builds upon and extends the knowledge and skills of the previous year" (UCSMP, 2003).

The authors of *Everyday Mathematics* believe it is important to begin the foundation of mathematical literacy at an earlier age than traditional programs offer. The range of the kindergarten through sixth grade curriculum encompasses the following mathematical strands: algebra and uses of variables; data and chance; geometry and spatial sense; measures and measurement; numeration and order; patterns, functions, and sequences; operations; and reference frames (UCSMP). These strands are interwoven into the curriculum enabling students to have multiple opportunities to review and practice skills on a variety of levels. The spiral curriculum allows for a specific concept

to be five times in two years, giving children many opportunities to discover to concept when the student is developmentally prepared to do so (Cotton and Wikelund, 2004).

The *Everyday Mathematics* authors present a number of distinguishable features in the curriculum. UCSMP features real-life problem solving that are not presented in isolation, but are linked to real world situations. Each *Everyday Mathematics* lesson includes balanced instruction ranging from whole group instruction/discussion to individual activities. While working cooperatively, children learn to work as a team, which emphasizes cooperation rather than competition. It also provides numerous methods for basic skills practice and review, which may involve enhanced technological use. With this, communication is emphasized to enable students to discuss their mathematical thinking in their own words. The deeper understanding of concepts within the classroom environment allows enhanced home-school partnerships by families engaging under positive circumstances (UCSMP, 2003).

The *Connected Mathematics Project* (CMP) is similar to the pedagogy of *Everyday Mathematics* in that it is a spiral curriculum emphasizing a hands-on, problem-solving methodology. CMP is a standards-based problem-centered curriculum designed for sixth, seventh, and eight grade students. The project was developed at Michigan State University by five university faculty members, and began as a National Science Foundation grant project. *Connected Mathematics* consists of twenty-four related units developed from the five following major strands of mathematics: (1) data analysis and probability, (2) number sense and operations, (3) geometry, (4) measurement, and (5) algebra (Cain, ¶ 6). The authors of CMP integrated numerous mathematical goals into one single strand:

"All students should be able to reason and communicate proficiently in mathematics. They should have knowledge of and skill in use of the vocabulary forms of representation, materials, tools, techniques, and intellectual methods of the discipline of mathematics. This knowledge should include the ability to define and solve problems with reason, insight, inventiveness, and technical proficiency."

As stated previously, *Connected Mathematics* is a problem-centered reform curriculum where students develop understanding and skill as they investigate problems through various learning techniques. This model is extremely different from the traditional model in which teachers tell students facts and demonstrate procedures, and then ask students to memorize and practice. The *Connected Mathematics* instructional model consists of three phases: launch, explore, and summarize. The first segment is the launch phase when the teacher launches the problem with the whole class. At this time, the teacher provides a clear picture of what is expected by helping students understand the problem setting, the mathematical context, and the challenge. The second segment is the explore phase enabling students to gather data, share ideas, look for patterns, make conjectures, and develop problem-solving strategies in a variety of collaborative efforts. During this phase, the teacher asks appropriate questions to redirect students, and to provide confirmation when needed. The final segment is the summarize phase of instruction students discuss, in their own words, the various strategies used to approach and solve the problem. Again, the teacher monitors the discussion with appropriate questions and redirection when needed (CMP website).

Through the three instructional phases, *Connected Mathematics* provides skill practice with concepts, skills, and algorithms in class and at home. CMP is not exclusively for the students; it is for teachers as well. The materials are written enabling teachers to learn from them too. Furthermore, each *Connected Mathematics* unit has been field tested, evaluated, and revised with consistency in performance improvement. It has proven successful in many different locations of the United States (CMP website).

Judith Cain conducted an evaluation of the project; results in 22 sites in Texas showed that, over a three-year period of time, the combined average score increased nine percent on the mathematics portion of the Texas Assessment of Academic Skills. Some of those pilot districts improved scores as much as 19% and outperformed non-CMP students at all three grade levels. At the eighth grade level, students of the Connected Mathematics project showed noteworthy difference in scores then of non-CMP students. Those CMP eighth grade students advanced an average of 1.5 grade levels from fall to spring testing (Cain, ¶ 9).

Conversely, not all districts, parents, and students commend new mathematics programs such as *Connected Mathematics* and *Everyday Mathematics*. Despite the positive research of the programs, parents see their children "mindlessly repeating sixth-grade stuff and the administration is saying 'Trust us, trust us..."(Hellman ¶ 12). Parents of seventh grade students in the *Connected Mathematics* project have complained that math classes are too slow and too easy. Teachers have tried to describe the focus of CMP, but parents are concerned that covering old topics for too long is monotonous and will leave their children uninspired (Hellman, ¶5). Parents feel that their children will suffer while the school works out the dilemmas.

Parents have experienced mathematics education in conventional classes characterized by lecture, silence, and monotony. Today's mathematics classrooms remove all three of those traditional features, and replace them with a dynamic program where children explore new patterns in cooperative groups and engage in mathematical discussions. Parents may not understand the significance of the structure of a homework assignment to encourage further investigation and develop a greater depth of knowledge. Reform mathematics provides more open-ended responses, varying perspectives of a single problem, and they may require little computation judging against traditional repetition and rote memorization. When comparing traditional and contemporary methodologies, parents may view the latter as unstructured. The unstructured perspective perceives the teacher as lacking adequate control and the students maintaining too much control and responsibility for their learning (WCER Highlights).

The authors of the *Connected Mathematics* understand the difficulty for parents to understand the diverse curriculum of their children. Children of all ages are encountering different kinds of mathematics than their parents received during their school years. CMP attests that it is not easy to see the mathematics and developments of concepts, reasoning, and skills by merely browsing through the learning materials. For a comprehensive view of the curriculum, parents must examine teacher and student materials, the resulting discussions in the classroom, and student work. Parents and guardians should understand the overarching goals of such mathematical reform programs as well. As parents become more involved in their child's mathematics education, their understanding and appreciation of what their children are experiencing

increases. As a result, the enhanced parental support leads to greater students achievement (CMP website).

The positive impact of parental involvement is well documented. "A home that supports children as students contributes significantly to their school success"(Garrett, ¶ 5). Family provides for the primary educational environment for student learning, therefore, parental involvement in education relates directly to student achievement (Norton and Nufeld, 54). There are several different forms of parent participation in education and the school community. Parents may support education by attending school functions, responding to school responsibilities, and by helping students improve their school work – providing encouragement, actively engaging in studies, modeling desired behavior, organizing a work space, and monitoring homework completion. Outside the home environment, parents can volunteer in the classroom and school community, as well as take an active role in community's decision-making of educational issues.

Steven B. Sheldon (2003, 150) sites numerous studies supporting the belief that all parents should actively participate in their children's education to obtain higher academic achievement. "Parents are the quintessential role models...[parents] leave an indelible mark on the child"(Coleman, 7). As cited in Norton and Nufeld (2002), several educational researchers support the relationship between active parental involvement and increased student achievement, improved self-esteem, enhanced behavior, higher ambitions, and better school attendance. The investigations of Herman and Yeh (1983) of parental involvement on the achievement of second and third graders in 250 California elementary schools displayed a significantly higher success rate of students whose parents were actively involved in education compared to other students. Walson, Brown,

and Swick (1983) confirm the same results in their study, "The Relationship of Parents' Support to Children's School Achievement." Furthermore, McEwan (1999) claims the effects of such relationships are more student success in school, more parental support, and more efficient problem solving between parents and school faculty (Norton and Nufeld, 45).

As cited in Norton and Nufeld, Coulombe (1995) determined two main reasons for encouraging parental involvement: (1) supportive parental involvement increases the probability of student academic achievement, and (2) parental involvement in the area of volunteerism contributes directly to school and program support (46). Parents who are more aware of the academic objectives of mathematics reform have the ability to become "unofficial but true teachers' aides" (Johnson and Webster, 1994). Confirming Johnson and Webster's viewpoint, educational researcher's Cotton and Wikelund support that the most effective forms of parental involvement are those which engage parents in working directly with the children in learning activities at home. Becoming more active in supporting homework assignments, or tutoring produce impressive results as compared to more passive forms of participation.

The home influences the completion of a homework assignment by creating an environment that either facilitates or inhibits study. Consequently, homework influences student academic achievement. As cited in the extensive review of models, the authors of A Model of Homework's influence on the Performance affirm the research derived by Coulter (1979), Keith (1982), and Cooper (1989).

Coulter presented a chronological model on the three phases of the homework process. "Coulter's results suggested that during classroom follow-up, the amount of teacher feedback on homework, the correspondence of tested material to material included on homework, and the relating of homework assignments to other class work positively affected classroom test results, attitudes and ultimately academic achievement" (Cooper et. al., ¶ 5). Whereas, Keith used several large national data sets to test academic achievement models, which resulted in homework as a predictor.

More recently, Cooper (2001) was the first to test a model of the influence of homework on class performance. A total of 428 students and parents, as well as 28 teachers of classroom grades two and four took place in the study. The data collected discovered several significant findings. First, the likelihood of students to complete homework assignments was positively related to the elimination of distractions in the home environment. Second, enhanced student ability and positive parent attitudes on homework were attributed to greater parent facilitation. Third, student's attitude towards homework was positively related to parent's attitude toward homework. Finally, classroom grades predicted how much homework the student completed. In essence, active parent participation played a major role in each of the significant findings of this study. Nonetheless, parents appear to adjust their type of involvement with homework depending on the ability level of their child (Cooper et.al, ¶ 54).

Conversely, Coleman (2001) acknowledges that most research insinuates a sharp decline in parental involvement in school between elementary and middle school. Coleman cites research by Ladson-Billings (1994) indicating the plausible reasons parents may not be involved in their child's education. Among the variables mentioned

are: distant school locations from home and parent lack of transportation to school functions; need for the employment of both parents; and some parents are intimidated by the school environment. Other attributing factors to the decline of parental involvement are: different expectations as children grow older; home to school distance; change of schools; larger schools; greater numbers of teachers interact with students in a single day; and parent lack of understanding of system and programs (Coleman, 9). However, some parents endure the same tribulations and yet are involved in their child's academic education. "The question becomes, What is the difference that makes the difference? The answer invariably lies in the value that is placed on education and the degree of sacrifice and personal commitment one is willing to make to support one's values" (Coleman, 9).

In relation to this study, the review of literature strengthens the need to determine whether the knowledge of parents/guardians can adequately support the mathematical achievement of their child's education. The exploring strategy of mathematics reform is unique and quite diverse from the traditional "telling" approach, which signifies the importance understanding the conceptual differences. In essence, can learners of traditional mathematics promote academic achievement of learners of contemporary reform methodologies?

All issues considered, research provides evidence for the significant relationship between parental involvement and student achievement. Cotton and Wikelund justify that the most effective forms of parental involvement are those, which engage parents in working directly with their children on learning activities at home. Homework is one endeavor designed for that particular purpose. As parents become more involved in their children's mathematical education, their understanding of the routines, practices, and

experiences increases. As a result, parents often increase their support and enhance the school efforts to understand mathematics reform.

Chapter 3

The Methodology of the Study

The focus of this research study is to determine the degree to which parents/guardians can adequately support the success of their children's innovative mathematical education. This study will concentrate on a variety of different research questions in attempt to recognize the understandings and efforts of parents in their child's mathematics education. The fundamental inquiries are: to what extent can parents/guardians adequately support the mathematics achievement of their child? What kind of strategies do parents implement to assist in homework and meet the needs of their child? What are the parental concerns of contemporary mathematics reform?

The research being tested in this study states, parents/guardians skills and knowledge of today's mathematical practices insufficiently support their children's mathematical achievement. A qualitative review will take place by collecting four forms of data to meet the objective of this study. The four forms of data collection are: (1) student perceptions surveys, (2) parent/guardian perception surveys, (3) parent/guardian interviews, and (4) a teacher journal recording home-school communication. If the research verifies the study's hypothesis, teachers will be better able to foster an environment where the mathematic needs of parents and children are met to further student achievement.

Sample Size and Composition

To have a usable data unit, data was obtained from the mathematics teacher, at least one student in the teacher's class, and at least one parent or guardian of a student within the class. A total of two teachers sixth grade mathematics agreed to take part in the study. One teacher taught an *Everyday Mathematics* curriculum, whereas the other taught the *Connected Mathematics Project.* When the data was analyzed, a total of 34 students participated, ranging in age from eleven to thirteen years old. Of the participating sixth grade students, 21 parents/guardians volunteered to take part in the survey. While only seven of those adults took part in the interview portion of the study.

The response rate for the students was approximately 66%. Of those students involved in the study, 61.8% of their parents took part in the parental survey. Whereas, only 17.7% of the participating parents completed the interview portion of the study. The teachers in the sample were White women, and both had over 15 years' teaching experience.

The school that agreed to take part in the research was the Clinical Internship II placement of the principal investigator, which is selected at random by the college of education. The research study will be conducted at Webster Elementary School[1]. The kindergarten through sixth grade school is located in middle class, suburban neighborhood of Southern New Jersey. With an average family size of 3.14, the ethnicity of the persons living in this district is 95.8% White, 2.1% Black and 1.3% Hispanic. 80.4% of the persons living in this neighborhood have a high school degree or higher, whereas only 24.4% have a Bachelor degree or higher education.

[1] Webster Elementary School is a pseudonym; the actual school where the study was conducted will not be disclosed.

Instruments

The student survey, which is entitled the Student Perception Survey, was developed explicitly for this study. The multi-item questionnaire was pilot tested with a small, heterogeneous sample of students and teachers of other sixth grade classrooms before the actual data collection began. The pilot test led to survey revisions in wording and the amount of questions.

The Student Perceptions Survey consisted of 8 questions regarding mathematics, parental assistance with homework and test preparation, and the perceived success rate of such support. Three of the questions asked the students to rate parents involvement in their home between one and ten. The other questions were open-ended, aside from one multiple-choice question concerning the methods of parental assistance with mathematics problems, allowing students to reinforce their answers with experiences and justifications. The Student Perception Survey questions are:

1. On a scale of 1 to 10, how would you rate the support you receive from your parents/guardians on math homework? (The number 1 would mean very little help and the number 10 would mean that your parents always assist with your math homework.)
2. How do your parents/guardians help with your math homework?
3. Do your parents/guardians review your math homework after it is completed?
4. On a scale of 1 to 10, how would you rate the support you receive from your parents/guardians when preparing for a math test?
5. How do your parents/guardians help you prepare for a math test?
6. When asking your parents/guardians for help on a math problem, do they (a) answer using their own mathematics strategies, (b) look at you math textbook, notebook, or previous worksheets to help answer, or (c) ask someone else to help determine the answer?

7. Rate the success of your parent's assistance from 1 to 10. (The number 1 would mean that their responses are mostly incorrect and a number 10 would mean that their responses are always correct.)
8. Who do you normally ask for help with math questions?

The parent survey, entitled Parent/Guardian Perception Survey, was created specifically for this study as well. Similar to the Student Perception Survey, the parent survey is a multi-item questionnaire piloted in the school environment. The pilot test was given to teachers of Webster Elementary School who are also parents of children currently receiving an education. The testing led to revisions in the wording and addition of questions. The Parent/Guardian Perception Survey consisted of six questions concerning parent/guardian support in mathematics. The majority of the questions were open-ended, and those that were not asked for further explanations to enable parents to justify their responses. The Parent/Guardian Perception Survey questions are:

1. Do you feel your mathematical knowledge base adequately supports your child's learning?
2. Rate your ability to support your child's mathematical learning from 1 to 10, one signifying difficulty to assist and ten suggesting the ease of supporting. Please explain your score.
3. What concerns do you have in the assistance of your child's mathematical problems/equations?
4. Do you feel confident to respond to any mathematical question your child expresses? If not, what types of questions cause the uncertainty?
5. To resolve a mathematical question, are you more apt to (a) create your own methodology to reach an answer, (b) revert to the strategies that were taught to you as a child, or (c) explore the contemporary mathematics program/textbook to support the current studies of your child?
6. What can your child's school do to foster an environment where parents/guardians are more supportive of the current mathematical practices?

The Parent Interviews was an instrument designed to allow the investigator, teacher, and parent convene to examine varying mathematical practices. The fundamental objective of the interview was to ask the participating parents to explain percentages. More specifically, the parent was to think of the investigator as a student who needed assistance with percentage word problems. There will be three types of questions (I, II, III) asked of the parent. Of those three types of questions, there will be two of each kind, and only one will be asked at random. A total of three questions percentage word problems will be raised. Off to the side on the table there were many different tools that could be used to assist the explanation process such as the mathematics textbook, money manipulatives, beans, calculators, sheets of paper, and pencils. The investigator used this time to examine the parent's strategies towards solving the word problems, and how those strategies related to the mathematics program and the answers given on the Parent/Guardian Perception Survey. Many of the Parent/Guardian Perception Survey questions were reiterated in the interview to reaffirm their discernment of mathematical support.

The final instrument used in this study was a Teacher Journal. The Teacher Journal was a notebook and folder used to document all notes and comments made from parents concerning mathematics. Each communication would be given a number and documented within the journal. The documentation would include the communication number, date, the mathematics material being studied, and the comment.

Procedures

In February 2004, a meeting was help between the investigator and the principal of the Clinical II Internship placement. At the meeting, the background and nature of the study was explained to obtain authorization to begin the study. The next meeting to occur involved the principal, investigator, and the two mathematics teachers whose class would be used in the investigation.

Subsequent to the conferences, letters were sent home to the families of all students who have the option to participate. The letter described the research study and the importance of the data collection. Along with the letter was a permission slip for each student to return stating whether or not they could participate in the research study. After two weeks from initial contact, new informative letters and permission slips were sent home to the families who did not respond. Those students and parents who did not respond to the second contact were lost to the study.

To minimize classroom disruption during questionnaire administration, the Student Perception Survey was given at the beginning of the selected mathematics classes by the researcher. The investigator read through the entire survey and reminded the students to answer thoroughly for a better understanding. The procedural description was meant to reduce the variability of how instructions were given and to decrease additional student questions.

The Parent/Guardian Perception Surveys were sent home through the student's homework folders entitled Friday Folders. Friday Folders contain various papers, letters, tests, and project grades that are collected throughout a single week. Friday Folders are then taken home on the weekend to allow parents to sit and review the contents of the

folder. The parent or guardian must sign each piece of material in the folder, for a student homework assignment grade. By sending the survey home through this method that is already instilled within the student and their families, it will allow for greater family awareness and participation.

During the next three weeks, the investigator will make contact by phone with the parents/guardians of the participating students. This call will enable the investigator to directly thank the participants, and to attempt to make an interview appointment. The interviews will be scheduled according to the needs of the families participating. The investigator can arrange during-school and after-school hours in the designated mathematics classrooms.

The investigator, mathematics teacher, and parent/guardian will all attend the interview session. There are three types of questions that will be asked of the parent. The questions will begin at Type I, moving to Type II after completion, and then finally to Type III. The questions used are as follows:

Type I

1. To advertise a new chocolate bar, a chocolate manufacturer advertises 25% MORE, FOR FREE! If the standard chocolate bar is 50 grams, what is the size of the new bar?
2. A bizarre shopkeeper is selling paint on discount. He offers a 50% discount if you come into the shop wearing a purple shirt, and a further 50% discount if you can say 'I need to buy paint' backwards. A pail of paint originally costs $64. How much does it cost if you get both discounts?

Type II

3. A dog has a litter of 3 male pups and 4 female pups. What was the percentage of each sex?
4. By adding an extra person to the assembly line, the number of speakers produced per day increased from 230 to 287. What is the percentage increase?

Type III

5. A salesman earned $1500 commission last week, on a commission rate of 12%. What were his total sales for the week?
6. A farmer claims that a new milking process extracts 8% more milk from each cow. If the new milking process gets an average of 7.2 liters per cow, what was the average of the original process?

The Parent/Guardian Perception Survey questions will be reiterated at this time as well. This incorporation of perception questions may alleviate the unusual interview method. It will also allow the investigator to get a better judgment of the ability levels of the parents to assist with diverse mathematic curriculums in the home.

Chapter 4

The Results of the Study

To what extent can parents/guardians adequately support the mathematics achievement of their child? What kind of strategies do parents implement to assist in homework and meet the needs of their child? What are the parental concerns of contemporary mathematics? To determine the significance of these questions, the research study analyzed student surveys, parent surveys, parent interviews, and a teacher journal. In this study of parental involvement, the hypothesis being tested states: parents/guardians skill and knowledge of today's mathematical practices insufficiently supports their children's mathematical achievement. The data analysis proves inclusive due to the need of further investigation.

The first concern of this study is the support available to students within the home environment. Of 22 adults who responded to the Parent/Guardian Perception Survey, 16 believe their mathematical knowledge base adequately supports their child's learning. When given further explanation of the answer given, 6 of those 16 parents made reference to the career choice and the involvement of mathematics.

(1) Parent 1: Yes, but I work with high school students – "in class support".

(2) Parent 5: Yes, I could assist. I am an accountant.

(3) Parent 11: Yes, of course. A strong mathematical background is required in my job.

Not only did the parents identify their mathematical ability with their job, but their children as well.

(1) Student 3: My Dad is a math whiz at work.

(2) Student 15: My mom is an accountant, so I get all the help I need from her.

(3) Student 32: My dad because he is a builder so he uses measuring and math a lot.

Although 16 parents felt they had the ability to support their child's mathematical needs, the majority of the student responses did not confirm the parental perception. When students rated the support they received from their parents on math homework from 1 to 10 (one being little support and ten being the most), 21 of 34 student responses ranked their parents 5 and lower. Yet regardless of the rank, almost every student's expanded response made reference to only receiving help when asking for it.

(1) Student 7: 9, because if I don't need help then I don't get it.

(2) Student 9: 10, because they help me when I need it.

(3) Student 10: I think I would rate them a 3 because they do help me a lot but lately I've become better and do not need help from them.

(4) Student 19: 9, I might not ask for help.

(5) Student 26: I would rate the support as a 5 because I don't always need their help.

This leads one to wonder, when do parents cease asking to see their children's homework? Does the age of the student demand greater individual responsibility? At this age should children have full responsibility of their homework completion? Accordingly, why do parents discontinue the mathematical assistance? Parents may not

understand the significance of the structure of a homework assignment to encourage further investigation and develop a greater depth of knowledge (********). "Parents are the quintessential role models...[parents] leave an indelible mark on the child" (Coleman, 7). Therefore, parents must be aware of the misperception, and guide their children in to greater achievement. However, the awareness of both students and parents may be correct and the mathematics program may instigate the lack of knowledge. Howe and Warren's first standard for accountability and improvement in a good mathematics program states that it should "develop a process that involves teachers, administrators, parents, students, and other citizens" (*********).

When parents responded to the ability ranking of their support from one to ten (one signifying difficulty and ten acknowledging ease), 19 of 22 parents placed their ability at five or above. Moreover, a greater implication appeared in the analysis of this question and response. The vast majority of the participating parents ranked their ability and cited the changing mathematics methodologies from the traditional method. However, these responses were dispersed among the different ratings.

(1) Parent 3: 3, I have no idea what she is doing in math these days.

(2) Parent 4: 7, I am an accountant and sometimes I confuse Maureen[4] because my method to get an answer is different than the way she is learning.

(3) Parent 5: 8, some of the new math I do not understand.

(4) Parent 6: 5, I can't help her these days without her textbook.

(5) Parent 8: I would have to say a 7 because math has changed over the years.

(6) Parent 15: 6, some of the new ways kids are learning are different than when we were kids.

[4] This is a pseudonym. Any child or parent's name will not be disclosed.

The abundance of similar responses indicates the challenge of contemporary mathematics reform within the home environment. The Connected Mathematics Project recognizes the difficulty for parents to understand the diverse curriculum of their children. CMP believes it is necessary for parents to have a full comprehensive view of the program by examining teacher and student materials, screening classroom discussions, and perusing student work(**********). This portion of analysis verifies the need to create and implement parent mathematics orientations to better meet the needs of students and adults.

With the recognized difficulties in assisting students of new mathematics methodologies from the perceptions of adults of traditional math practices, how do parents support their children? The Student Perception Survey stated, "When asking your parents/guardians for help on a math problem, do they (a) answer using their own mathematics strategies, (b) look at your math textbook, notebook, or previous worksheets to help answer, or (c) ask someone else to help determine the answer?" Of 34 students surveyed, 23 responded with (a) answer using their own mathematics strategies. This could not necessarily be a negative impact, however the mixing of methods could leave the child more confused and unprepared for the subsequent exploration in math reform curriculums.

(1) Student 10: Usually A, it helps my parents know what they are doing.

(2) Student 17: A, because they say it's easier.

(3) Student 20: A, because they need to remember how to do it to help me.

(4) Student 25: A, they do it however they think is right and then try to explain it to me that way.

Indeed, the student's perceptions are correct concerning their parent's mathematics methodologies when assisting with homework. 18 of 22 parent surveys acknowledge their inability to follow the contemporary mathematics program. The adults have noted that they mostly assist by creating their own methodology to reach an answer and revert to strategies that they were taught as a child. These assessments were also verified in the Parent Interviews.

Of the 22 parents participating in the Parent Perception Survey, only six adults volunteered to take part in the Parent Interviews. The main portion of the interview session was to observe how a parent would assist a student with three percent word problems. Each word problem was labeled Type I, II, or III, with increasing difficulty.

Beginning with Type I word problems, each parent created their own strategy and chose to rationalize the problem by using manipulatives to explore the problem.

(1) Parent 2: Since the question involved 50% it was easy to relate to money.

(2) Parent 5: Showing portions of a chocolate bar was easy by drawing the bar and shading in portions.

The methodologies chosen were presented well, and kept in line with the exploratory methods of the mathematics reform curriculums, whether they were aware of it or not. However, the Type II word problems created more discomfort, as noted by the investigator during observation. The parents who received question three, in random selection, continued to use manipulatives to represent the word problem. Those who received problem four reverted to the methods they were taught as a child. Each of those parents commented similarly, "I only remember this because I had to memorize it what seems to be a million times" (Parent 1).

In the same way, Type III word problems were answered by reverting to childhood memory. Two parents felt they could not respond to the problem because they fear they would confuse the student or get lost in the "outlandish" explanation (Parent's 3 and 5). The common methodology used was: is over of equals percent over one hundred (is/of = %/100) and then use cross-multiplication and division to conclude.

The Parent Perception Survey and Teacher Journal were the sources used to document the parental concerns of mathematics reform and their children's success. Of the surveys, only one concern adult directly stated the concern of "changing math methods such as Connected Math" (Parent 1). Other concerns are the general inability to assist their child and the lack of knowledge of "new" mathematics and terminology. Only nine parents reported no concerns in their mathematical assistance. However, the Teacher Journal, which documented all communications between home and school in relation to math, reported otherwise. Of the 52 students in the mathematics classes, 28 different communications were received within a 30-day period. A few assorted comments are:

> Comment 2/ Parent 5: I was unable to help Billy with his homework. He did not have his notes, and I did not understand.
>
> Comment 9/ Parent 14: Julie should be excused from her math work because I could not assist her.
>
> Comment 10/ Parent 29: Can Bob have another day for his homework? I believe my explanation misled him.
>
> Comment 23/ Parent 20: How do you expect me to help my child when I don't understand the information myself?

Through the analysis of the Parent Interviews and Teacher Journal, it is evident that many parents do not feel able to support their child's homework, which is contradicting to the Parent and Student Perception Surveys. Aside from the obvious limitations, the investigation should be furthered with greater opportunities for direct observation and communication of parental involvement.

To confront parental concerns, the Parent Perception Survey questioned how the school could foster a more supportive home-school environment to better meet the needs of the current mathematical practices. The responses were extremely insightful and conveyed positive feedback in ways parents could become more involved. The majority of the parents requested materials to be provided for the home. Some materials listed were: textbook, parent guide, manipulatives, worksheets, and step-by-step notes. "This way the 'I forgot them at school' excuse can no longer work"(Parent 13). However, the multiple requests for step-by-step accounts of the mathematics confirms the lack of knowledge about the program that Howe and Warren as well as Connected Mathematics says is necessary. Other resources requested were more family math nights, parent workshops, a website, and varying after school hours.

The most unsuspecting and insightful finding of this study involves the gender roles of the family. Of 34 student responses, 18 children turned to their father or the adult, male figure of the household for assistance. Whereas, only seven asked their mother, and three of those children "don't live with [their] dad". When asked in question eight of the Student Perception Survey: "Whom do you normally ask for help with math questions?" responses were:

(1) Student 3: My dad because he's like a math whiz and always gives me a better understanding.

(2) Student 10: I usually ask my mom, but then my mom tells me to wait for my dad because he understands it better.

(3) Student 12: My dad because my mom has trouble in math.

(4) Student 19: My mother, I don't live with my father. But he is better.

(5) Student 21: My dad because he is better at math than my mom.

(6) Student 23: My dad or older brother because they are a lot better at it.

(7) Student 33: It all depends who is around but I prefer to ask my dad because he gets it right.

To further the investigation of the relationship between gender and mathematics skills, next time I would ask for the parents to declare their gender when responding to the Parent Perception Survey. This survey could bring more insight to the gender role by confirming which parent noted the challenge of mathematics, and which noted the ease of the subject. It would also be interesting to place the educational levels and majors of those parents with their responses, as well as their career placements.

Chapter 5

The Summary and Discussion

The data analysis proved this study to be inconclusive when trying to identify the extent to which parents are able to support their children's math reform curriculums. The overwhelming response of the Parent Perception Survey acknowledged the belief that parent's knowledge base of mathematics satisfactorily assists student needs. However, there is an evident lack of participation found in the Student Perception Survey responses. To further the investigation of this contradiction, a greater amount of questions should be asked of the parents regarding how much they assist, and that amount compared to assistance during other years of schooling. If those results synthesized a new issue of age and parental involvement, it could be detrimental to the success of the contemporary mathematics programs. Family provides for the primary educational environment for student learning, therefore, parental involvement in education relates directly to student achievement (Norton and Nufeld, 54).

Howe and Warren, as well as the authors of the *Connected Mathematics Project* feel it is imperative for the family to become aware of the overarching goals of the new mathematics curriculums, and how each program facilitates the meeting of those objectives. The research study clearly shows that the adult community does not have an sufficient knowledge base through Parent Perception responses, Student Perception responses, Parent Interviews, and the Teacher Journal. However, is this a fault of the parents, or is it due to the lack of communication between school and home? To advance

this investigation, I believe it is important to complete a more in-depth research of the school. It is essential for the institution to foster an environment that is conducive to diverse community living situations.

A further suggestion to administer another questionnaire to parents and students to determine the gender roles attributed to strong mathematics skills and abilities. This is a key finding in this research study. According to the responses, about 58% of the students involved ask for assistance from the adult male figure within the home environment, whereas only 23% turned to the female adults. Why are males generalized to have a strong mathematic background? What subject areas cause student to look to females for support? Why is there an intense gender bias?

There are several limitations involved in this study. This is a qualitative study; therefore the procedures in this study are subjective. Different researchers conducting the same study may result in different findings. Also, this study is based on volunteerism. Volunteerism can affect the study by gathering similar participants, and eliminating those of extreme circumstance which could alter the results. Additionally, there is limited reliability. Parents and students may have been more susceptible to answering according to what they expect the answer to be, instead of answering honestly. The multiple choice questions may have been too concrete and allowing no leeway for different answers.

The final limitation is the small sample size of the study. The foundation of the studies results is rooted in the various surveys, interviews, and teacher journals, with small sample sizes the results are likely inaccurate. More specifically, the minute group of parents to volunteer for the interviews skewed the subjective response of the results. For future studies, I would advise that the study occur in more than one school, each of

diverse demographic backgrounds. This will allow for a larger population sample, and a more conclusive study.

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Appendices

Dear Parent/Guardian:

I am a graduate student in the Collaborative Education MST program at Rowan University. I will be conducting a research project under the supervision of Dr. Susan Browne as part of my master's thesis concerning the skills and knowledge of parents to adequately support their child's/children's learning in today's mathematics programs. I am requesting permission for your child to participate in this research. The goal of the study is to determine how the difference in today's mathematics methodologies as compared to strategies typically learned by parents/guardians affects the skills and knowledge needed to effectively support student learning.

Each child will be invited to participate in a student perception survey. This perception survey will inquire about the level of support at home concerning the challenges of current mathematics programs. For example, the students will be questioned about whether the adults of their household promptly resolve mathematic problems using their prior knowledge, develop their own strategies to reach a conclusion, or if the adults reflect on the practices of the textbook to determine the answer. To preserve the student's confidentiality, the student perception responses will be retained at the conclusion of the study, and for the study's identification purposes, student numbers will be issued to maintain anonymity. All data will be reported in terms of group results; individual results will not be reported.

The decision whether or not to allow your child to participate in this study will have no effect on your child's standing in his/her class. At the conclusion of the study, a summary of the group results will be available to all interested parents. If you have any questions of concerns, please contact me at (609) 468-7732 or you may contact Dr. Susan Browne at (856) 256-4500 ext. 3748. Thank you.

Sincerely,

Jenny Honold

Please indicate whether or not you wish to have your child participate in this study by checking the appropriate statement below. Please return this letter to your child's teacher by Friday, May 7, 2004.

_____ I grant permission for my child _____ to participate in this study.

_____ I do not grant permission for my child _____ to participate in this study.

_____ _____

Parent/Guardian signature Date

Parent Interview Questions

Percentage Word Problems

Type I

1. To advertise a new chocolate bar, a chocolate manufacturer advertises 25% MORE, FOR FREE! If the standard chocolate bar is 50 grams, what is the size of the new bar?
2. A bizarre shopkeeper is selling paint on discount. He offers a 50% discount if you come into the shop wearing a purple shirt, and a further 50% discount if you can say 'I need to buy paint' backwards. A pail of paint originally costs $64. How much does it cost if you get both discounts?

Type II

3. A dog has a litter of 3 male pups and 4 female pups. What was the percentage of each sex?
4. By adding an extra person to the assembly line, the number of speakers produced per day increased from 230 to 287. What is the percentage increase?

Type III

5. A salesman earned $1500 commission last week, on a commission rate of 12%. What were his total sales for the week?
6. A farmer claims that a new milking process extracts 8% more milk from each cow. If the new milking process gets an average of 7.2 liters per cow, what was the average of the original process?

Parent/Guardian Perception Survey

Please answer all questions with as much detail as possible. All information will remain confidential.

Your child's name: _____

1. Do you feel your mathematical knowledge base adequately supports your child's learning?

2. Rate your ability to support your child's mathematical learning from 1 to 10, one signifying difficulty to assist and ten suggesting the ease of supporting. Please explain your score.

3. What concerns do you have in the assistance of your child's mathematical problems/equations?

4. Do you feel confident to respond to any mathematical question your child expresses? If not, what type of questions bring cause the uncertainty?

5. To resolve a mathematical question, are you more apt to create your own methodology to reach an answer, revert to the strategies that were taught to you as a child, or explore the contemporary mathematics program/textbook to support the current studies of your child?

6. What can your child's school do to foster an environment where parents/guardians are more supportive of the current mathematical practices to support student achievement?

Student Perception Survey

Please answer all questions with as much detail as possible. All information will remain confidential.

Student Number: _____

1. On a scale of 1 to 10, how much would you rate the support you receive from your parents/guardians on math homework? (The number 1 would mean very little help and the number 10 would mean that your parents always assist with your math homework.)

2. How do you parents/guardians help with your math homework?

3. Do your parents/guardians review your math homework after it is completed?

4. On a scale of 1 to 10, how would you rate the support you receive from your parents/guardians when preparing for a math test? (The number 1 would mean very little help and the number 10 would mean that your parents always assist with preparing for a math test.)

5. How do your parents/guardians help you prepare for math tests?

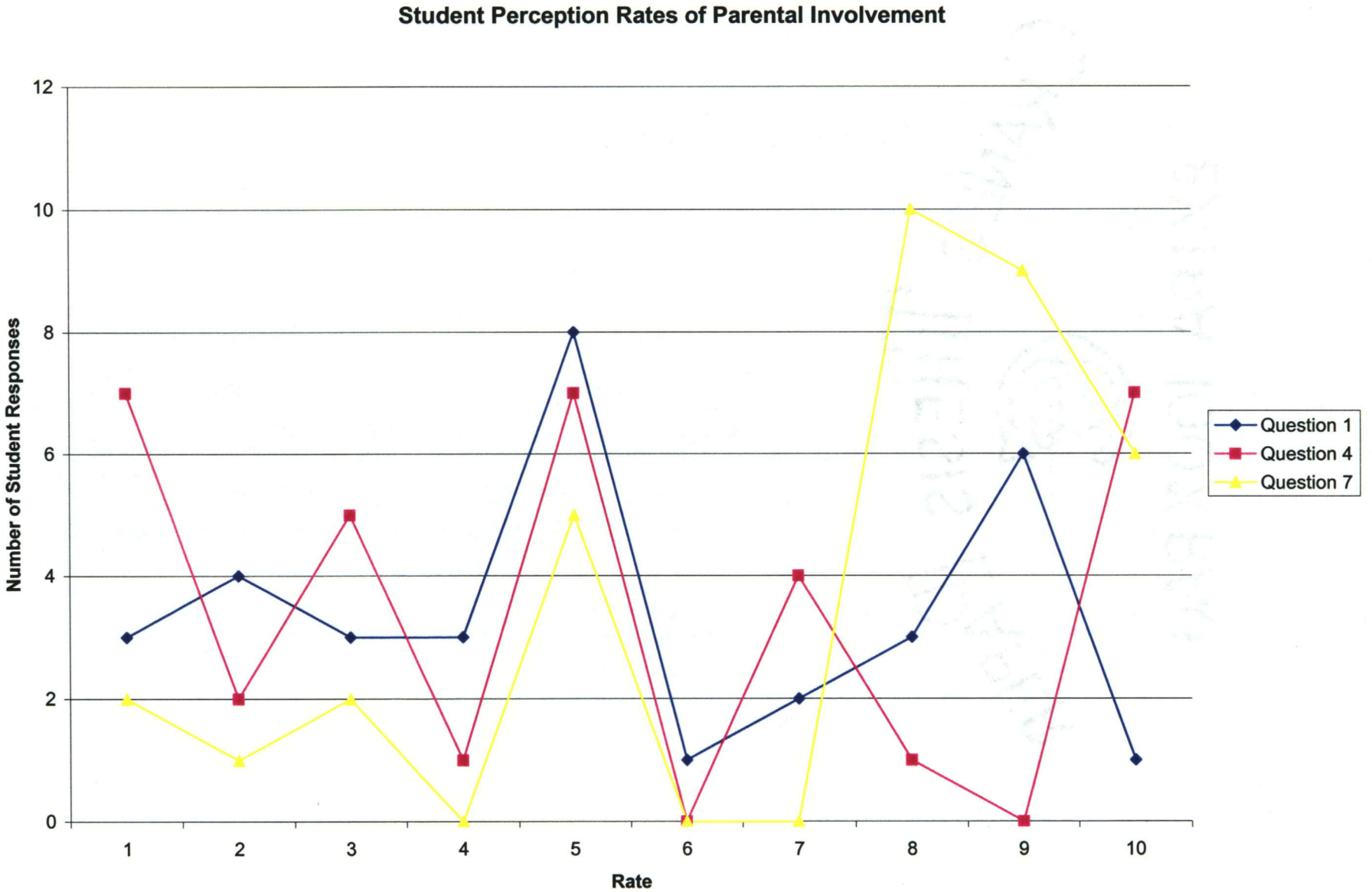
6. When asking your parents/guardians for help on a math problem, do they (a) answer using their own mathematics strategies, (b) look at your math textbook, notebook, or previous worksheets to help answer, or (c) ask someone else to help determine the answer?

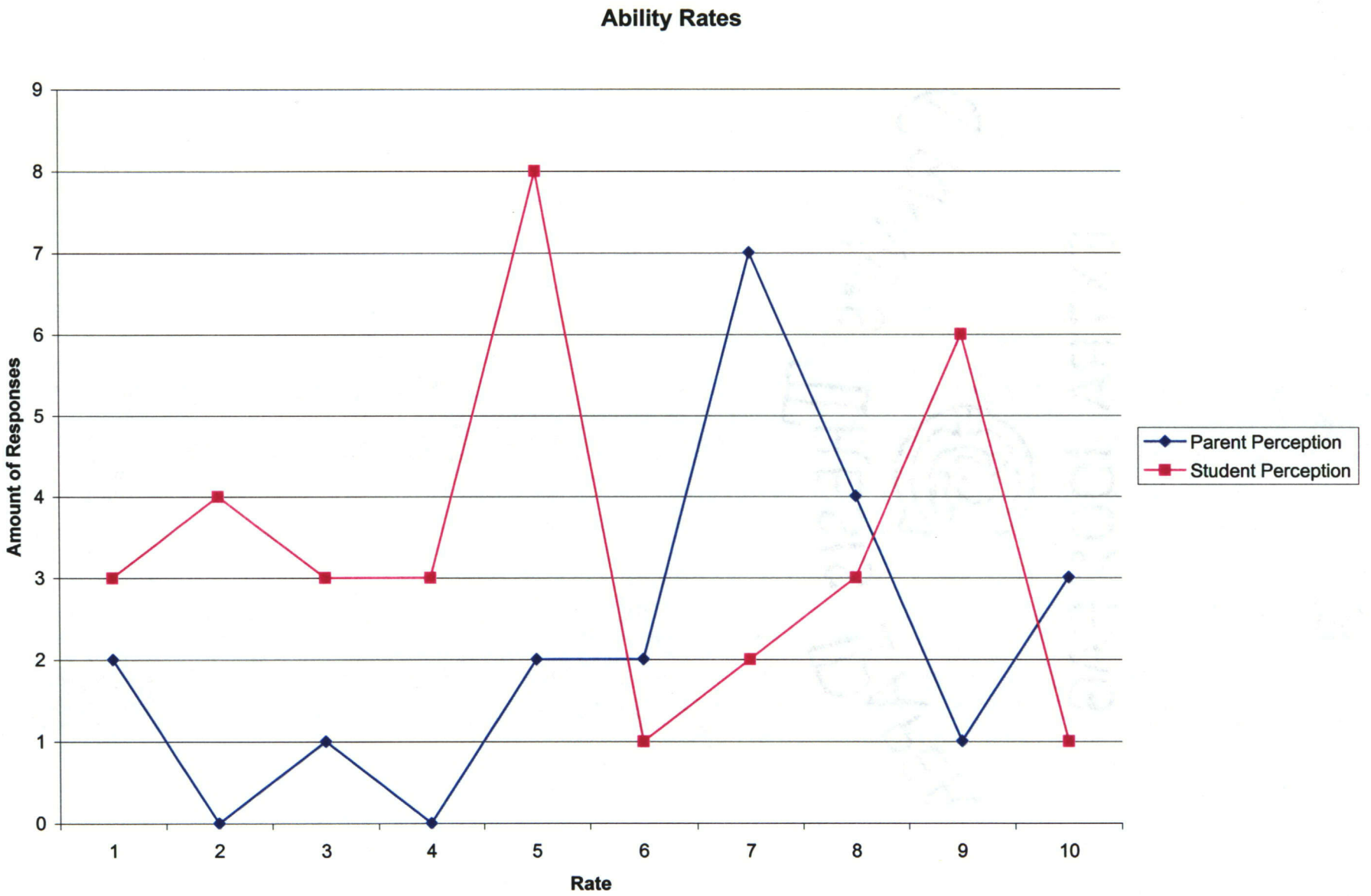
7. Rate the success of your parent's assistance from 1 to 10. (The number 1 would mean that their responses are mostly incorrect and a number 10 would mean that their responses are always correct.)

8. Who do you normally ask for help with math questions?

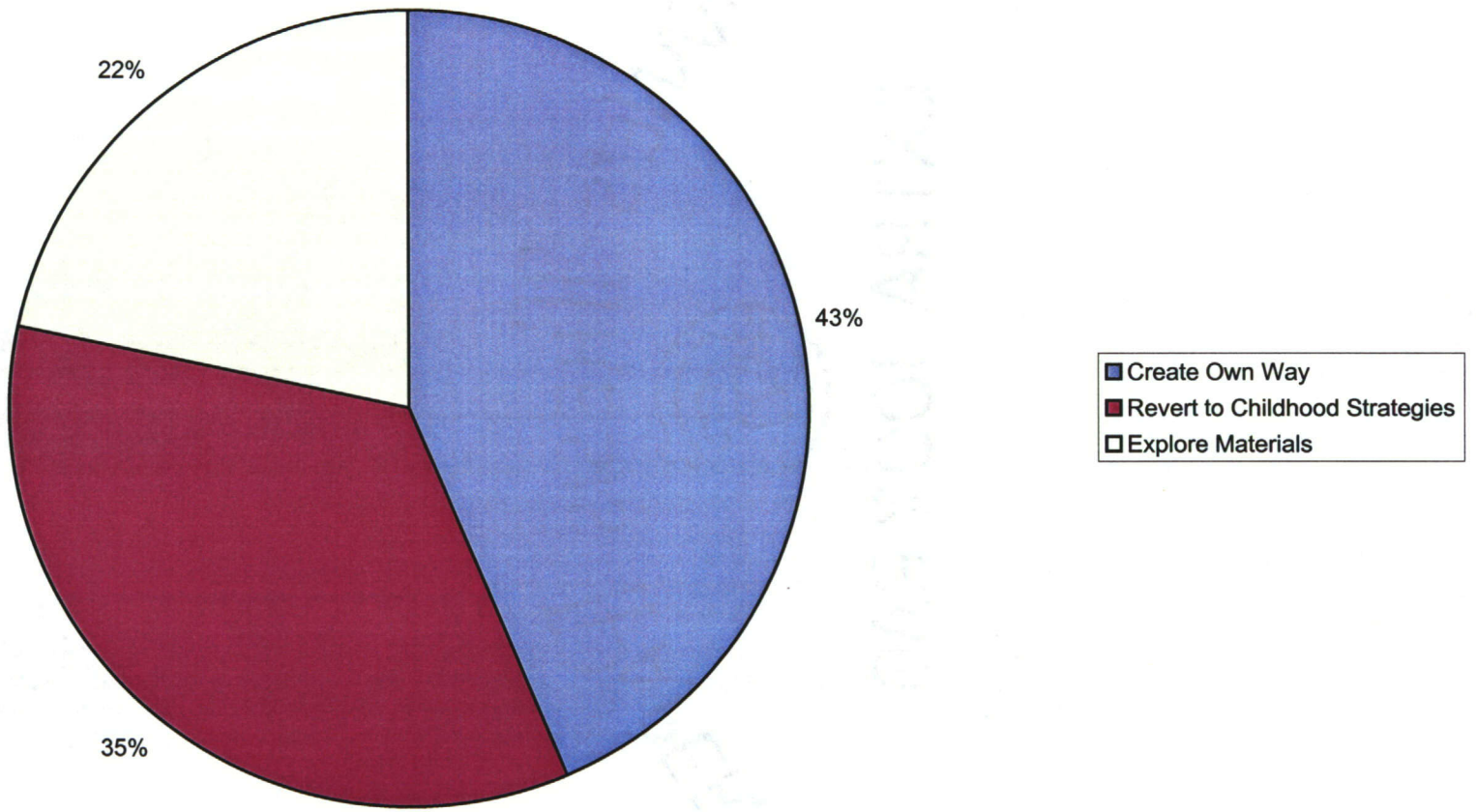
Student	Question 1	Question 3	Question 4	Question 6	Question 7	Question 8
1	4	Y	7	B	5	Dad
2	5	Y	4	A	10	Dad
3	9	N	10	A	9	Dad
4	N/A	N/A	N/A	N/A	N/A	N/A
5	5	N	3	C	5	Teacher
6	5	N	2	A	5	Dad
7	9	Y	10	A	8	Dad
8	3	Y	3	A	8	Dad
9	10	N	10	A	9	Mom
10	3	N	5	A	8	Mom
11	5	Y	3	A	5	Dad
12	8	Y	7	B	8	Dad
13	3	N	10	A	9	Dad
14	4	Y	1	A	9	Mom
15	9	Y	1	A	10	Dad
16	9	N	10	B	9	Dad
17	5	N	1	A	9	Mom
18	2	Y	3	C	3	Mom
19	1	Y	10	A	9	Dad
20	9	N	7	A	8	Mom
21	8	Y	5	A	8	Dad
22	2	N	3	A	1	Dad
23	8	Y	5	A	9	Dad
24	6	N	10	B	8	Friend
25	2	N	1	A	9	Dad
26	5	Y	5	C	5	Dad
27	7	N	5	A	8	Mom
28	9	Y	2	A	10	Dad
29	7	N	7	A	8	Aunt
30	4	Y	1	A	10	Dad
31	5	Y	8	B	8	Dad
32	1	N	4	B	3	Dad
33	2	N	5	A	10	Mom
34	5	N	5	B	10	Mom

Parent	Question 1	Question 2	Question 4	Question 5
1	Y	10	N	Explore
2	Y	8	Y	Create
3	N	3	N	Create
4	Y	7	Y	Create
5	Y	8	N	Revert
6	N	5	N	Explore
7	Y	7	Y	Create
8	Y	7	N	Revert
9	Y	10	Y	Revert
10	Y	7	N	Revert
11	Y	10	Y	Revert
12	Y	7	Y	Revert
13	Y	8	N/A	Revert
14	Y	7	N	Create
15	N	6	N/A	Explore
16	Y	5	Y	Revert
17	Y	8	N	Revert
18	N	6	N	Create
19	Y	7	N	Create
20	N	1	Y	Revert
21	Y	9	Y	Explore
22	N/A	N/A	N/A	N/A


Student Perception Rates of Parental Involvement
Number of Student Responses
12
10
8
6
4
2
0
1
2
3
4
5
6
7
8
9
10
Rate
Question 1
Question 4
Question 7


Ability Rates
Amount of Responses
0
1
2
3
4
5
6
7
8
9
1
2
3
4
5
6
7
8
9
10
Rate
Parent Perception
Student Perception

Parent Methods of Resolving Math Problems



Who do you normally ask for mathematics help?