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Reading and Mathematics Bound Together: Creating a Home Environment for Preschool Learning

Amber J. Godwin[1], William H. Rupley[2], Robert M. Capraro[1] & Mary Margaret Capraro[1]

[1] Texas A&M University & Aggie STEM, College Station, TX, USA

Correspondence: William H. Rupley, Texas A&M University, College Station, TX, USA. Tel: 1-979-845-8384. E-mail: w-rupley@tamu.edu

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Amber Godwin is a graduate student in the department of Teaching, Learning, and Culture with research interests in preschool reading and mathematics integration. William H. Rupley is a Professor of Reading Education in the Department of Teaching, Learning and Culture with research interests in reading acquisition and development, reading assessment and correction, reading comprehension development, and text processing. Robert M. Capraro is a Professor of Mathematics Education with research interests in mathematics assessment and cognition, quantitative methods, and STEM teaching and learning. Mary Margaret Capraro is an Associate Professor with research interests in problem solving, elementary mathematics teaching and learning, and teacher education.

Abstract

The combination of mathematics and reading in family reading time can positively impact children's ability to make sense of representations in both mathematics and reading. Four families volunteered to participate in this field based inquiry to learn how to integrate mathematics and reading in parent-supported activities. Four parents and their preschool aged children together attended training sessions to learn and practice how to create a home environment supportive of both reading and mathematics. Each parent completed questionnaires about implementation of the four training sessions with their child. Parent responses were overwhelmingly positive regarding the suggested behaviors for creating a pro-reading/mathematics home environment. Parents reported that the reading and mathematics home instruction activities gave children learning opportunities from combining early mathematics skills and reading skills and they also learned new vocabulary. Home learning activities also helped children learn effortful control skills when reading and talking about mathematics storybooks. There was also rapport building through family conversations that were attributed to parents' use of instructional activities.

Keywords: reading, mathematics, pre-school, parent-child interactions

1. Introduction

1.1 Binding Together Reading and Mathematics: Creating a Home Environment for Learning

What if parents of preschoolers could teach them with materials that are easy to understand, to use, and assure a better start in formal education? Two of the most crucial areas for success in school are reading and mathematics and they share common features young children can learn before going off to school. Our snapshot of reading/mathematics home instruction program presents a picture that has value for preschool parents. For example, future school achievement could be enhanced if parents had a manageable home learning environment.

A small, but rapidly growing body of research supports that fundamental mathematic and reading concepts acquired during children's preschool years provide a foundation of basic thinking skills that increase their likelihood of learning success when they enter a formal school setting. Parent directed learning interactions in the home provide opportunities that contribute to a child's long term learning development (Coleman, 1990; Ren & Hu, 2011) and researchers have called for an increase in investigations that center on the effects of home learning environments on preschoolers learning. (Hindman & Morrison, 2011; Niklas & Schneider, 2013). It is within reason to argue that home learning environments facilitate foundational learning (DeBruin-Parecki, 2009; Rothstein, 2004) in a child's expressive vocabulary (Landry, Smith, Swank, Zucker, Crawford, & Solari, 2012),

literacy development (Niklas & Schneider, 2013), early mathematic attainment (Loeb, Bridges, Bassok, Fuller, & Rumberger, 2007), and socio-emotional skills development (Rodriguez, Hines, & Montiel, 2009; Zellman & Waterman, 1998). Families that nurture their children's learning in the home are helping these children form a positive attitude about learning and an interest in discovery; that will aide them in later academic achievement (Hindman & Morrison, 2011).

Positive parent-child relationships have long been recognized as contributing factors to a child's success in a formal school setting (McBride, 1990; Reynolds, Mavrogenes, Bezruczko, & Hagemann, 1996; Stahmer & Gist, 2001). These positive relationships have resulted in parents acquiring a deeper and more complete knowledge of their children's learning capabilities (Fen & Chen, 2001). Such knowledge enable parents to become more aware of changes they can use in the home, including the development of parent initiated positive learning environments (Quiocho & Daoud, 2006; Ramirez, 2004). Recent research has affirmed the important role that home environment and by proxy, parents, play in development of early skills for preschoolers (Sénéchal & LeFevre, 2014; Skwarchuk, Sowinski, & LeFevre, 2014). One way research has begun to acknowledge the role of the parent in the research process is by asking for parent input while doing "home environment" studies. Including parents in the research process helps validate their roles as data providers for research purposes (Leung, Sanders, Leung, Mak, & Lau, 2003; Mann, Pearl, & Behle, 2004; St. Pierre, Ricciuti, & Rimdzius, 2005) in much the same way teachers are used as professional observers (Choppin, 2011; Jacobs, Lamb, Phillipp, Schappelle, & Burke, 2007; Lappan, Fey, Fitzgerald, Friel, & Phillips, 2006). Recognizing and capitalizing on this special relationship that is developed between a parent and child during appropriate and enjoyable in home learning activities can provide engaging learning experiences that with unique modification for each child may carry far into future learning.

Affirmation of the benefits of parent directed learning activities in the home for young children is reported in findings from a meta-analysis of six long-term studies of school readiness (Duncan et al., 2007). These researchers found that when controlling for cognition, attention, and socio-emotional skills, the best predictors of early school success are a child's foundational math skills and reading skills. In fact, early math skills have been found to be twice a strong predictor of academic success as reading skills (Duncan et al., 2007). Preschoolers with basic math and reading skills outperformed children without the skills with entering a formal education setting (Purpura, Hume, Sims, & Lonigan, 2011). Such evidence supports that young children can be better prepared for success in both reading and mathematics before entering formal schooling because of parent/child in home learning environments.

1.2 Purpose

The current exploratory inquiry is intended to provide further insights into the symbiosis between enhancing foundational reading and early mathematics skills through creating a pro-reading and pro-mathematics home environment using parent supported trainings. Because past studies on family literacy have alluded to the importance of parent participation in reading at home (Ho, Leung, & Cheung, 2011; Lundberg, 2009; Morrow, 1983; Raikes et al., 2006; Santos & Alfred, 2011; Walberg & Tsai, 1985; Westerlund & Lagerberg, 2008), this inquiry was developed to further substantiate the importance of reading at home while showing consideration for early mathematics development. These parent-led pro-reading and pro-mathematics interactions in the bioecological setting of the home were identified as enhancing a child's foundational academic development in a recent study (Godwin, 2015).

Since storybook reading is already a practice in the homes of some young children, mathematics storybooks were used to integrate early concepts associated with both early numeracy and foundational reading. Storybook reading times focused on parent(s) and child(ren) interacting with storybooks in a way that created enriching dialogues, pretend play, and other forms of sense making that promote critical thinking (Bradley & Donovan, 2012). The intent was that these factors would maximize the potential benefits of reading interaction time between parents and children while providing supplemental early mathematics informal instruction. In order to guide our inquiry of the effectiveness of implementing this symbiotic pro-reading and pro-mathematics home environment, we framed several guiding questions:

1). Will parents' reading of mathematics storybooks to children in home instruction enhance child(ren)'s understanding of early mathematics concepts?

2). Will parents' reading of mathematics storybooks to children in home instruction enhance child(ren)'s basic reading skills (phonology skills, recognition of letters, sight word recognition, letter sound relationships, text features, etc.)?

3). Will parents reading of mathematics storybooks to children in home instruction enhance the development of child(ren)'s mathematics vocabulary?

1.3 Theoretical Framework

Theoretical framework was based on quilting together elements of emergent literacy and mathematical theories including the idea that children's literacy understandings begin early and before formal education (Sulzby, 1985, 1988; Sulzby & Teale, 1987; Valencia & Sulzby, 1991). We also agreed that children learn to use language through engaging in dialogues with a newly acquired language (Harste & Woodward, 1989). Thus, the hope was that the language of mathematics (Adams, 2003; Capraro et al., 2010, 2011) obtained through parent guided interactions with mathematics storybooks would bind together mathematics and reading into a single experience for the children (Green, 1995; Stanberry, 2014; Stone, 1990). We were speculating that parents' reading mathematics storybooks to children enhanced: (1) understanding of early mathematics concepts, (2) overall foundational reading skills, (3) the utilization of mathematics vocabulary and (4) overall effortful control.

Further theoretical framework for our inquiry is provided by the Pygmalion theory of Rosenthal and Jacobson (1968, 1992). Basically, this theory states when adults form expectations for children's behavior they act in a differential manner based on those expectations. The assumption was that if our exploration of melding mathematics and reading is consistent with this well-known theory, the child's early mathematics conceptual understandings, foundational reading skills, utilization of mathematics vocabulary and display of effortful control would conform more closely to what was expected of the adult counterpart.

We assumed that if a parent believed a child capable of understanding and engaging in mathematical and reading activities and dialogues then a child would exhibit behaviors showing that they were capable of engaging in mathematical dialogues and early mathematics activities. This assumption about relationships illustrates the impact of adult expectations on child's performance in our related outcomes: enhanced knowledge in early mathematics, foundational reading, mathematics vocabulary and effortful control.

2. Methodology

This inquiry involved the parents of children who were enrolled in a private daycare in a large southwestern urban area. The site was chosen based on its cosmopolitan makeup; eight middle class families with children volunteered to participate but only four families remained at the end of our inquiry. Of the remaining four families, parents' ages ranged from early-30s to mid-40s; the ages of their children varied from one- to five-years-old. Families included one African-American mother with two children, one Asian-American father with two children, and one Anglo-American father with one child and one Anglo-American mother with two children. Thus, there were four parents and seven children. These families learned about the inquiry because fliers were posted throughout the daycare center a week before the first voluntary training session to inform parents about the opportunity to participate. Each flier included an informational overview, dates, time, and onsite location of training sessions.

Because participants had children enrolled in a daycare facility it was understood that parents had time constraints that effected their ability to stay home as a full time care giver. Past studies on family literacy have urged flexibility on part of the researchers with regards to length of training sessions and the time when those sessions are held in order to include fathers (Morgan, Nutbrown, & Hannon, 2009). Therefore each "come and go" training session was held over an approximately one and a half hour period allowing parents to arrive at the onsite training after picking up their child(ren), participate in an individualized training session, and then go home to ensure engagement on part of both the parent and the child(ren) at the end of their day.

Data were obtained through surveys, observations, and interviews. This tripartite approach is commonly used when attempting to evaluate instructional methods (Cuevas, Lee, Hart, & Deaktor, 2005; Lee, Deaktor, Hart, Cuevas, & Enders, 2005). These methods enabled us to synthesize mathematics storybook reading practices and mathematical understandings, early numeracy development, word recognition and oral language development, interest in math activities and effortful control of the child during family shared mathematics storybook reading.

2.1 Training Sessions

Each weekly training session was designed to provide detailed strategies on how to create a pro-reading and pro-mathematics environment in the home while providing materials for parents to implement them. These proposed strategies facilitated the enhancement of reading through symbiotic mathematics instruction in the home using recommendations by DeBruin-Parecki (1999) and "Edible Math: Hands on Math Strategies" by Project Central (Green, 1995; Stone, 1990). DeBruin-Parecki's research (1999) centered on establishing an effective family early mathematics literacy program with an emphasis on interactive reading based on detailed

home activities and materials that organically integrate mathematics and reading. For example, following a recipe naturally marries reading to mathematics and that is a common practice in the home (Heilman, Blair, & Rupley, 2002). The Project Central study (Green, 1995; Stone, 1990) focused on synthesizing and presenting other activities for children to do at home using food manipulatives to learn mathematics. Our training for parents was developed based on these earlier studies (DeBruin-Parecki, 1999; Green, 1995; Stone, 1990) while supporting a triangulated method of instruction that has been found to be successful when teaching children (Green, 1995; Stanberry, 2014; Stone, 1990). Each of the parts included children's word counting book, corresponding snack, and manipulative activity.

Still, simply providing materials to families was not enough to develop a reading and mathematics friendly environment in the home, parents needed instruction on how to effectively use those materials to create a pro-reading/pro-mathematics environment in the home. Therefore, a list of suggested pro-reading and pro-mathematics parent behaviors was developed using the joint position statement issued by The National Association of the Education of Young Children and the National Council of Teachers of Mathematics (NAEYC & NCTM, 2002). This statement was adapted into a family adult/child curricula for behaviors to help enhance interactive reading time utilizing the four parts of the developed training. The behaviors suggested in the curricula centered around parents' enhancing a child's understanding of early math through reading developmentally appropriate math storybooks, practicing good reading skills, promoting vocabulary acquisition through answering questions about new words, and incorporating new words into family discussions while observing whether or not there was a change in a child's effortful control. Additionally, questionnaires were adapted to correspond to each part of the training programs in order to gather self-reported information from parents (Appendix B) as parents were seen as keepers of special knowledge about their children (Leung et al., 2003; Mann et al., 2004; St. Pierre et al., 2005). Furthermore, self-reporting has been found to be an effective method of information collection with home studies (Palmer & Baroody, 2011). So each part of the training focused on applying unique elements of the adapted curricula in order to create a pro-reading and pro-mathematics home environment then the parents reported their perceptions of the application of that curricula at the next training period.

2.2 Training Sessions

Family oriented "come and go" training sessions occurred over the course of four weeks.

Each training session was open onsite for approximately 90 minutes and took place during the same specified "after work" hours over four concurrent weeks. Families were individually stepped through the entire training procedure as they arrived at the session over an approximately 15-30 minute period and were then informally dismissed. Parents were welcomed into the first training session with an introduction and an explanation of the purpose of the inquiry. Following this introduction, parents completed a pre-training survey intended to identify what behaviors their family already engaged in to promote a pro-reading/mathematics environment in their homes. We used this information to construct what reading/mathematics home instruction was happening prior to any training.

After the initial, introductory session in which the first week's suggested behaviors were presented and modeled, each training session opened with parents completing a report corresponding to the following week's part of the training. Then parents shared observations in a conversational, non-structured interview in order to report experiences, concerns, and excitement about trying the previous week's behaviors in their homes. Each parent was first asked the question "How did your child respond to this week's instructional activities?" and then follow-up questions were asked based on parents' responses (Baumbusch, 2010). We used a short hand method to take notes on the informal conversation with each parent in order to maintain an authentic exchange and relationship with each of them. Parents were then presented with the new part of the training for the coming week using detailed explanation and modeling. First, new behaviors and activities were explained. Next these were demonstrated and modeled for parents with a researcher's 19 month-old son while participating parents watched.

Subsequently, parents practiced these strategies with their own children with researcher's watching, answering questions and providing clarification to maximize understanding of the in home reading/mathematics behaviors and activities. Observational data on family behaviors during these practice times was recorded through hand written notes. The observation portion of the training session was important because it was hypothesized that when families practiced new behaviors with supervision and constructive feedback, they would then use the same kinds of behaviors in their homes. To assure consistency, parents were encouraged to ask questions about the new expectations introduced each week. After questions were answered, parents were given a "goodie bag"

that supported the implementation of each part of the training. The goodie bag contained (A) the mathematics counting storybook for the week (McGrath, 1994, 2000a, 2000b; McGrath & McGrath, 1998) for instance the Pepperidge Farm Goldfish Counting Fun book, (B) a snack to compliment the storybook for the week such as Goldfish crackers, (C) a supplemental early math activity such as charting or sorting using the snack provided, and (D) a detailed synopsis of the suggested behaviors presented at the training session, (Appendix A). The components of the "goodie bag" represented the weekly curriculum for creating a reading/mathematics home environment in order to assure fidelity of implementation.

3. Insights for Questions

As anticipated, there were strong positive responses provided by parents about promoting child's learning through employing the learned strategies of mathematics/reading dialogues and activities. Foundational mathematics, foundational reading practices, vocabulary acquisition and effortful control were reported as being impacted by the suggested pro-reading/mathematics behaviors.

Responses collected during interviews revealed that support and guidance for parents on the use of reading/mathematics home instructional practices are valuable and beneficial in facilitating children developing foundational reading skills including word recognition, enhanced development of oral language skills through using mathematics vocabulary, and that mathematics activities helped them understand mathematics concepts. Parents' responses confirm those reported by Green (1995) and Stone (1990) on the capabilities of parents to instruct their children effectively when provided guidance and support. Self-reported and observational information closely integrated the three guiding questions we set forth at the start of this exploratory inquiry:

1). Will parents' reading of mathematics storybooks to children in home instruction enhance child(ren)'s understanding of early mathematics concepts?

2). Will parents' reading of mathematics storybooks to children in home instruction enhance child(ren)'s basic reading skills (phonology skills, recognition of letters, sight word recognition, letter sound relationships, text features, etc.)?

3). Will parents reading of mathematics storybooks to children in home instruction lead to development of child(ren)'s mathematics vocabulary?

Considering the first question, one parent mentioned that when she questioned her children about adding and subtracting as an extension to the provided part of the training, she claimed "it was easy for them, addition and subtraction came naturally to them". Under normal circumstances, this parent might have overlooked the idea that she could further her child's knowledge of early mathematics concepts such as adding and subtracting. However, this parent understood her child's developmental capabilities and pushed her child forward to more challenging mathematics concepts than those suggested confirming that a parent has intuitive knowledge of the capabilities of her child and know how to stretch the thought processes while accommodating learning (Blair & Razza, 2007).

With regards to the second question, one parent shared that during family shared reading time, they "talked about the vocabulary found in pictures, math storybook reading time wasn't just about the numbers". This comment is intriguing because it provided evidence of a skill symbiosis that can occur when using mathematics storybooks as a medium of symbiotic reading and mathematics learning. In other words, reading a mathematics storybook does not just have to lead to discussions about mathematics, other vocabulary development can and does happen (Rupley & Nichols, 2005).

As for insights about mathematics vocabulary development parents overwhelmingly voiced their desire to continue to incorporate math into their family dialogues after being exposed to these pro-reading and pro-mathematics home-learning strategies. Reponses that confirmed this were, "Being a part of this has opened my eyes" and "Before this point by my own choice I had selected more verbal and language focused books, and not math focused. This is making me much more aware". These comments provide insights into parents' thought processes: the parents already knew the value of home instruction through reading but had not yet considered that mathematics could be a part of that as well. In fact, all parents reported an increase in mathematically based conversations-and other conversation topics in general as they became more aware not only of their child's propensity to learn mathematics but also of their child's developing vocabulary. In other words, parents stated that they felt as though they were able to talk to their children conversationally rather than by using "baby talk" because this activity had opened them to the idea that young children could participate in normal conversation. Thus the training expanded avenues of expression for families to talk to their children, including the

enhancement of expressive mathematics vocabulary while offering the idea to parents that children, too, can practice thought processing and self-expression.

One particular family provided robust evidence on the positive effects of the prescribed training. The family consisted of a mother and her two sons-ages two and five years old. On the evening of the third workshop, the boys were excited about going home and not necessarily participating in a particular training session but their attention was piqued when the math storybooks and corresponding snacks were presented in the goodie bag. Without prompting, the young boys started looking through the storybook provided for the week and they began "play reading" to each other. The older brother started interacting with text, sounding out words to his younger brother and making up words he did not know by using association with pictures in the storybooks. He also directed his brother where to place his snacks in the indicated areas of the storybook. In other words, through a self-directed act the older brother assumed the role of parent and the younger brother assumed the role of child and they "played" at having an interactive home reading by reading the storybook and doing corresponding mathematics activity, then they each ate their provided snack.

These young boys were not prompted to participate in these activities but were praised by their mother for doing so. The boys remained engaged in interacting with the text in the storybook and mathematics activity independently even as the trainer explained next week's part of the pro-reading and pro-mathematics training to the mother. The mother confirmed that these sorts of behaviors were similar to what the boys would do when driving home from training sessions. She noted how both boys were extremely interested not only in reading but also in learning more and talking more about mathematics as a result of the mathematics storybooks, snacks, and activities. It is notable that even though both boys are very young, they were participating in self-directed learning. Through their own desire to learn through the activities outlined in the training, they exhibited evidence of early mathematics conceptual attainment, early reading skill attainment, and early mathematics vocabulary development.

4. Discussion and Conclusions

A major issue in this inquiry was the number of participants. Although previous foundational studies on symbiotic reading and mathematics instruction have been conducted using as little as four family dyads (Anderson et al., 2004) we had hoped to include more families. Though eight families attended our training sessions, only four completed the entire series. Still, previous studies have concluded that family training activities must have flexibility in order to have sustained parent participation (Morgan, Nutbrown, & Hannon, 2009) so we allowed those families that had not been a part of the entire study to attend sessions in an effort to aid those families in creating a pro-reading and pro-mathematics environment in their homes despite their information being incomplete for inclusion in this inquiry.

This inquiry advanced the importance that parents can have in their children's acquisition of foundational skills in reading and mathematics skill building (Duncan et al., 2007), verified the value of socio-emotional skill building (McClelland et al., 2000), and supported the call for further evidence of the emergence of effortful control in young learners (Willoughby, Kupersmidt, Voegler-Lee, & Bryant, 2011) through integrated activities in reading and math. Strong corroboration emerged that reinforced the notion that children need to engage in fun, semi-structured educational learning activities in their homes (Blair & Razza, 2007) in order to capitalize on their curiosity about the world. The positive reactions and enthusiasm of the parents validate the theoretical framework we utilized (Rosenthal & Jacobson, 1968, 1992; Sulzby, 1985, 1988; Sulzby & Teale, 1987; Valencia & Sulzby, 1991). Information we collected substantiated that children were exhibiting early literacy and mathematics behaviors through their exploration of mathematic storybooks.

Our snapshot of the effects of this reading/mathematics home instruction program presents a picture that has value for preschool parents and educators. For example, there was evidence that future academic achievement could be enhanced for participating children because their parents established a manageable home learning environment. The reading/mathematics home instruction provided children with the opportunity to build on integrated early mathematics skills and foundational reading skills while learning new vocabulary. Home learning activities created opportunities for children to learn and practice socio-emotional skills, such as effortful control when reading and talking about the mathematics storybooks and engaging in related activities. There was also relationship building through enriching family conversations that were attributed to parents' use of instructional activities and confirms earlier research by Landry et al. (2012).

Parents reported overwhelmingly that their children responded favorably to their newly developed pro-reading/mathematics home environments. It could be argued that the children's positive responses were indicative of responding to parents' belief that they could learn and understand mathematics/reading. This

inference supports the Pygmalion effect (Rosenthal & Jacobson, 1968, 1992) because parent expectations for their child certainly evolved when new information about mathematics was introduced during reading/mathematics home instruction.

Other influences that emerged during non-structured interviews were related specifically to how the suggested behaviors made learning "fun" and exciting, supporting the benefit of such practices as pointed out in earlier studies (Blair & Razza, 2007; Green, 1995; Stanberry, 2014; Stone, 1990). All parents acknowledged that their children liked the math storybooks because they incorporated colorful snacks for the children to eat and that children responded well to counting books that had provided cut outs for specific placement of the snack for the week.

Observation of each family provided unique and valuable data on the dynamics of family shared reading times. One family's experience directly embodied the theories presented by McClelland et al. (2000) regarding the value of attention skills as well as those indicating that reading and mathematics are both valuable when considering a child's exhibiting effortful control (Duncan et al., 2007). Parents also agreed that their children liked sorting things. These observations reinforce the importance of providing children with engaging, informal learning environments in the home.

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Appendix A

Creating a Pro-Reading and Pro-Mathematics Home Environment Training Sessions Outline

	Part 1. *The Goldfish Counting Book*	Part 2. *The Cheerios Counting Book*	Part 3. *The Fruit Loops Counting Book*	Part 4. *The M&M's Counting Book*
Survey	Pre-intervention survey	Part 1.	Part 2.	Part 3. Post session: Part 4. Ending survey
Family based adult/child curricula	1) Enhance children's natural interest in mathematics and their disposition to use it to make sense of their physical and social worlds. 2) Build on children's experience and knowledge, including their family, linguistic, cultural and community backgrounds. 4) Use dialogue to strengthen children's problem-solving and reasoning processes as well as representing, communicating, and connecting mathematical ideas.	6) Provide for children's deep and sustained interaction with key mathematical ideas. 8) Provide ample time and support for children to engage in play, a context in which they explore and manipulate mathematical ideas with keen interest. 10) Support children's learning by thoughtfully and continually assessing all children's math knowledge, skills strategies.	3) Change how you address mathematics based on your child's ability. 5) Ensure that books are compatible with known relationships and sequences of important math ideas. 7) Integrate math with reading and reading with math. 9) Actively introduce math concepts, methods, and language through a range of experiences and reading.	Review behaviors 1-10
Activity	1)Goldfish sorting mat 2) Goldfish chart	Cheerios sorting mat	Fruit Loops charting mat	M&M's charting mat

Appendix B

Reading and Math Perception Survey Pre-survey

Directions. Please mark the following according to what most appropriately describes your family shared reading practice.

1). I give my child(ren) a chance to touch the book and turn the pages.

a. Almost always

b. Sometimes

c. Once in a while

d. Rarely

e. Never

2). I ask questions to my child(ren) about the story.

a. Almost always

b. Sometimes

c. Once in a while

d. Rarely

e. Never

3). I identify pictures in the book that are related to the story.

a. Almost always

b. Sometimes

c. Once in a while

d. Rarely

e. Never

4). I emphasize repeated words in the story.

a. Almost always

b. Sometimes

c. Once in a while

d. Rarely

e. Never

5). I relate the story to personal experiences.

a. Almost always

b. Sometimes

c. Once in a while

d. Rarely

e. Never

6). I use hand motions to demonstrate numbers when reading a counting story.

a. Almost always

b. Sometimes

c. Once in a while

d. Rarely

e. Never

Comments:

Reading and Math Perception Survey Training 1

Directions. Please mark the following according to what most appropriately describes your family shared reading practice.

1). By reading mathematics storybooks, I have found ways to enhance my child(ren)'s natural interest in math and their desire to use it to make sense of their physical and social worlds.

a. Agree

b. Somewhat agree

c. Neither agree nor disagree

d. Rarely

e. Never

2). I ask questions to my child(ren) about the story.

a. Almost always

b. Sometimes

c. Once in a while

d. Rarely

e. Never

3). I identify pictures in the book that are related to the story.

a. Almost always

b. Sometimes

c. Once in a while

d. Rarely

e. Never

4).I emphasize repeated words in the story.

a. Almost always

b. Sometimes

c. Once in a while

d. Rarely

e. Never

5). I relate the story to personal experiences.

a. Almost always

b. Sometimes

c. Once in a while

d. Rarely

e. Never

6). I use hand motions to demonstrate numbers when reading a counting story.

a. Almost always

b. Sometimes

c. Once in a while

d. Rarely

e. Never

Comments:

Reading and Math Perception Survey Training 2

Directions. Please mark the following according to what most appropriately describes your family shared reading practice.

1). By reading math storybooks, I am able to provide ways for my child(ren) to continually interact with key math ideas such as counting.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

2). By reading math storybooks, I am able to provide ways for my child(ren) to continually interact with numerals (examples: 1, 2, 3).

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

3). By using supplemental math activities that compliment math storybooks, I am able to encourage my child(ren) to play in a way that encourages exploration and manipulation of math ideas. Strongly agree

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

4). By using supplemental math activities that compliment math storybooks, I am able to provide ways for my child(ren) to continually interact with key math ideas such as counting.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

5). By using supplemental math activities that compliment math storybooks, I am able to provide ways for my child(ren) to continually interact with numerals (examples: 1, 2, 3).

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

Comments:

Reading and Math Perception Survey Training 3

Directions. Please mark the following according to what most appropriately describes your family shared reading practice.

1). By reading math storybooks to my child, I have found ways to enhance my child(ren)'s natural interest in math.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

2). By reading math storybooks to my child, I am able to build on my child(ren)'s experience and knowledge.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

3). By reading math storybooks to my child(ren), I am able to connect math to our family, culture or community backgrounds.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

4). We discuss what we read in math storybooks in order to strengthen my child(ren)'s problem-solving skills.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

5). By reading math storybooks to my child(ren), I find myself including representing, communicating, and connecting math ideas to practical experiences.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

Comments:

Reading and Math Perception Survey Training 4

Directions. Please mark the following according to what most appropriately describes your family shared reading practice.

1). I find that I change the way I talk about math based on my child(ren)'s ability.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

2). I have found that math storybooks are compatible with math ideas that my child(ren) knows.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

3). It is easy to integrate math with reading and reading with math during family shared reading time.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

4). I have started to actively introduce math concepts, methods, and language through a range of math experiences.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

5. I have started to actively introduce math concepts, methods, and language through math storybook reading.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

6). I support my child(ren)'s learning by continually assessing my child(ren)'s developing early math knowledge.

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

e. Strongly disagree

Comments:

Reading and Math Perception Ending survey

Directions. Please rank the following behaviors according to what you perceive to be the most beneficial behavior to enhance your child(ren)'s engagement in both reading and math. Please indicate the behavior that you think is most important with "1" and continue to rank the next most important behaviors until you reach 14, the least important behavior.

_____Enhancing my child(ren)'s interest in math through reading math storybooks.

_____Reading math storybooks to my child(ren) in order to build on my child(ren)'s experience and knowledge.

_____Reading math storybooks to my child(ren) in order to connect math to our family, culture or community background.

_____Discussing what we read in math storybooks in order to strengthen my child(ren)'s problem-solving skills.

_____Reading math storybooks to my child(ren) in order to connect math ideas to practical experiences.

_____Reading math storybooks in order to provide ways for my child(ren) to continually interact with key math ideas such as counting.

_____Reading math storybooks in order to provide ways for my child(ren) to continually interact with numerals (examples: 1, 2, 3).

_____Using supplemental math activities that compliment math storybooks, I am able to encourage my child(ren) to play in a way that encourages exploration and manipulation of math ideas.

_____Changing the way I talk about math based on my child(ren)'s ability.

_____Finding math storybooks are compatible with math ideas that my child(ren) knows.

_____Integrating math with reading and reading with math during family shared reading time.

_____Actively introducing math concepts, methods, and language through a range of math experiences including math activities that complement math storybooks.

_____Actively introducing math concepts, methods, and language through math storybook reading.

_____Supporting my child(ren)'s learning by continually assessing my child(ren)'s developing math knowledge.