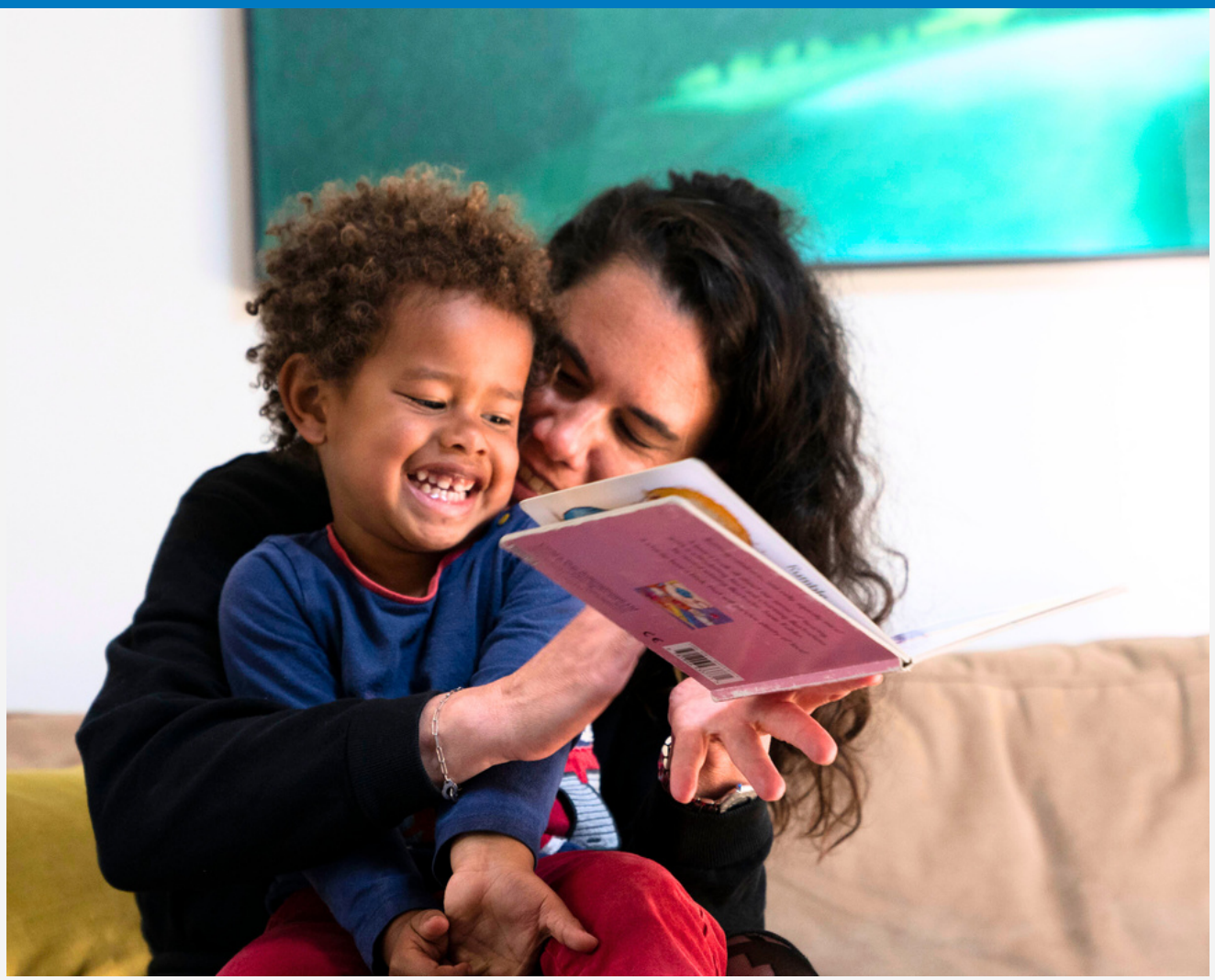
How a Family Math Workshop Series Helped Families Bond and Learn Together

A Case Study on the PBS SoCal Family Math "Peg + Cat" Family Community Learning Workshops



PBS SoCal

FAMILY + MATH

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Study Overview

The case study explored three families' experiences as they learned and played alongside their children in an interactive family workshop series.

Family and Community Learning (FCL) is a series of workshops that engage families in active, hands-on learning experiences. Designed for families with kids ages 3 to 5, the workshops use creative play and exploration to introduce families to activities and tools that can be used to develop knowledge, practices, and perspectives. Through child-led activities and experiences, the workshops aim to foster collaboration, communication, and problem-solving skills among family members. Developed by PBS SoCal, the "Peg + Cat" FCL is based on a model that was inspired by and built upon the Family Creative Learning work led by Ricarose Roque at the MIT Media Lab. "Peg + Cat" is an animated, math-based media property for 3- to 5-year-olds on PBS KIDS. In each episode, Peg and Cat are faced with a word problem that launches them on a fun adventure with new friends, learning math along the way.

The Family Math "Peg + Cat" FCL consisted of four bilingual (in English and Spanish) one-hour sessions that each explored a different early math concept through child-centered activities and media. The virtual sessions occurred weekly for four weeks on Zoom. Each session was divided into four parts: Eat, Explore, Make, and Share. In each workshop, families were tasked with helping Peg and Cat solve a problem using math skills. Families received educational materials and meal cards for all sessions.

The purpose of the case study was to explore parent perceptions and experiences during a collaborative workshop series that is uniquely designed for play and learning between a parent and child. Interviews were conducted before, during, and after the Family Math "Peg + Cat" FCL workshop series to understand families' experiences and their perceived changes in parent-child interactions, math teaching styles and strategies, and math enjoyment. Throughout the interviews, we heard how the workshop series fostered opportunities for family and sibling bonding, provided parents with new strategies for supporting math learning at home, helped families realize math could be fun, and unlocked the skills to become their children's first teacher at home.

How a Family Math Workshop Series Helped Families Bond and Learn Together

Highlighted Case Study Findings

Impact on Parents

New strategies for teaching math

Parents picked up a variety of strategies from the workshops that helped them support learning at home, including:

- Modeling
- Asking questions
- Playing together
- Using objects for hands-on counting
- Using everyday materials for math activities

Realized math can be fun

- Workshop activities demonstrated that math is more than just numbers, and that support could extend beyond homework assignments.
- Families realized that math could be integrated into their daily routines (like cooking, folding laundry, and going on walks) in playful ways.
- Families recognized the importance of teaching through interacting, talking, and playing.

Opportunities for family bonding

- The workshops served as a dedicated time to learn and play together, inspiring families to continue even after the series ended.
- Parents enjoyed the quality time together, which strengthened their relationship with their children.
- The workshops helped parents see that being present and engaged is one of the best things they can do for their children.

Embracing role as child's first teacher

- Parents realized they had the tools to be their child's teacher at home.
- As their children began looking to them for more help with math, parents were proud that they were able to help in ways they had not thought of before.
- Parents' enthusiasm for learning became contagious, fostering an environment where math became exciting and doable.

Impact on Children

Growth in math engagement

- Children were more excited and engaged when doing math at home.
- They also became more aware of and excited about math opportunities around them.
- Children began actively searching for ways to practice math in fun ways, such as when baking or cleaning up their toys.

Improved math skills

- Children demonstrated improved number recognition, stronger counting skills, sorting skills, and pattern recognition.
- Parents saw their children continuing to practice what they learned.
- Children initiated math activities on their own, suggesting that the workshops sparked a new interest in learning math with their parents.

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Liliana

Finding structured playfulness in math activities that foster sibling bonding

Liliana's experience

The workshop series inspired Liliana's family to seek out and create more opportunities to learn math at home, which gave her two sons a chance to bond with each other. The workshops also created a sense of structured playfulness that helped her sons direct their high energy into math practice. Liliana realized that she could teach her children math through fun activities, and that there was more to math than just numbers.

Background

Born and raised in Guatemala, 28-year-old Liliana has two sons (ages 3 and 10). She attended school until early high school and now cleans houses for a living. Growing up, Liliana never enjoyed math and always found the subject difficult. In the early years of her children's math learning, Liliana generally found it simple to support her children, but she worried that she would not be able to help them as much when they began to learn more advanced math. She joined the FCL workshops because she wanted to learn new ways to support her younger child, especially with homework.

Realizing math can be fun

Liliana described how the workshops increased feelings of enjoyment for math at home for her whole family. The workshop activities inspired her to find new ways to make math more fun at home, which helped her family see that learning math could extend beyond homework. She noted that her sons seem more interested in doing activities that involve math since participating in the workshop. They have become more excited about cleaning up at home because it relates to the concepts they have learned.

"Before, the children thought doing any kind of math at home was boring and they did not want to do it. But now I see they are practicing some of the workshop strategies," she said in Spanish. "Every day they cut up an apple and count how many pieces they have."

"I will continue to use the skills I learned with every homework assignment my children have and also at home because that is also where they can improve their math skills. They don't just have to be studying to practice math. They can also be playing or doing other things at home," she said.

New strategies for teaching math

Liliana learned the value of modeling activities, asking her children questions during playtime, and being present and engaged with them. Co-playing sustained her children's interest and enhanced the educational value of the activities.

"I liked how [the facilitator] asked the children questions during the workshop. Supporting their learning by asking questions and not leaving them to figure it out on their own helps the children not become bored with the activity. Otherwise, they would rather move on to other activities. It is better to be with them and learn together with them," she said.

More math conversations

Liliana shared that she began having more conversations involving math at home with her sons because activities and concepts they picked up in the workshops stuck with them, and they were excited to keep practicing. Some examples of conversations included classifying and completing patterns they saw around them and practicing math while sorting clothes. The workshops created a space for her children to bond with each other through daily household activities, such as doing their chores together. Viewing cleanup through a math-focused lens added a sense of playful structure to everyday tasks in Liliana's household.

"Before, [my sons] hardly obeyed the rules of the house," she said. "You had to tell them to clean up their things over and over, but now I just say, 'Let's sort the dirty clothes,' and they put their clothes in the hamper. Or sometimes their shoes are everywhere, and my younger son sorts them according to which are his, which are his brother's, and which are mine. He knows where he can put each pair of shoes, the size, and who they belong to." Last week when we were doing laundry, the little one said, 'I have three black shirts. I have two white ones,' while he was helping me sort them by color."

Liliana's growth in math confidence

Liliana's confidence with math grew as she realized that she could teach her children math through fun activities. The workshops helped her see that her sons could learn math while playing or doing other activities at home.

"The best thing is the time you dedicate to your children when you play and learn with them," she said. "I often run out of ideas about how to teach my children, but the workshops helped me with this. We don't necessarily have to teach the children numbers to teach them mathematics, but we can also teach them colors, drawings, and everything."

The workshops helped Liliana feel more confident in her ability to help her children with math because they showed Liliana how to think about math in a new way. "The workshops have had a great influence because I can see that we have made a lot of progress," she said. "Previously I had no idea how to [help the children with math], how to deal with homework, or things like that. The workshops helped me a lot with new things that were not explained to me before, maybe because I went to school in a different country. Some things are simply new to me because I didn't learn them that way. I am also impressed by the way these programs have the capacity to teach children in a fun way."

Opportunities to socialize

Liliana noticed that the weekly workshops were a new and different experience for her children. They enjoyed participating in the activities, socializing with other children, and expressing themselves.

"It was a very nice experience," she said. "My children were very happy. The hour we were in the meeting was a different time for them because we had never been in an activity like this, but they liked it very much. [The workshops] also give the children the opportunity to express themselves. They were encouraged to see that others are participating; they didn't want to be left behind, and they also raised their hands to participate."

Liliana and her family had the chance to observe other families and learn from them: "It was also very nice [to see the same families participating with us each week]," she said. "It's a nice activity because we also do it from home. We also got to know other children at the same time, and saw how other children interact, how other children behave. We also learned a lot from that. As I said, my kids saw a lot of children. Some paid attention, as always, while others did not. That's where they realized, 'I don't look good not paying attention. I want to pay attention.' That's what they picked up," she said.

Improvement in child's math skills

Liliana also noticed her younger son eagerly participating more at home whenever they talked about math and suggested that both of her children have become more confident doing math, as indicated by their excitement and engagement with numbers that they see around them. She also noticed that her sons seem more interested in seeking out math around them.

"They are becoming more confident," she said. "Their interest has changed because everywhere they go, they are seeing numbers, colors, and letters, and they are counting them. The little one picks up his cars or his toys and says, 'one, two, three.' It is sticking with him more. He is repeating it more, and the more he repeats it, the more it sticks with him."

Liliana said that learning to sort resonated with her family the most. Practicing sorting has helped both of her children become more organized at home because they see sorting as a fun way to organize their toys.

"My children have put sorting into practice the most because they spend a lot of time counting things, sorting their toys and clothes," she said. "My younger son learned how to differentiate and sort items by their sizes. The older one already had a bit of understanding, but my younger son didn't follow the rules for putting his toys away. Now he's picked up the habit. He playfully organizes his toys by size or by color. He also sorts his dirty clothes into his laundry basket."

Marlene

Bonding, playing, and becoming more attuned to her daughter's learning process

Marlene's experience

A busy mom of four, Marlene arrived at the FCL motivated to devote more time to her youngest child's learning, aware that she wasn't able to do so for her three older children. The workshop series gave her the chance to bond with her daughter because they got to spend time together and work together, which allowed Marlene to focus more on what her daughter observed and learned during the math activities. The workshops helped her become more attuned to the learning opportunities that exist around her. Marlene took notes during the workshops and thought of ways to use the activities at home, sometimes adding her own modifications.

Background

Born and raised in Mexico, 38-year-old Marlene has four children (ages 19, 17, 12, and 3). Working outside the home during their childhoods, she often did not have time to participate in programs that would help her support her children's learning at home. Marlene realized that she wanted to prioritize opportunities that would help her youngest child and make time for such opportunities, despite her busy schedule. She always loved the simplicity of math, and it has generally been easy for her to support her children with the subject.

"I think work can wait, but your children's learning can't because they grow and grow every day and you gradually end up taking away their learning [if you are not spending that time with them]," she said. "That is my mentality right now because my other children are grown up. I told myself that I should be willing to participate in any activity as long as it is beneficial for my daughter. I think that we should learn a little more from the children and live a little more with our children."

Opportunities for parent-child bonding

The workshop series served as a dedicated time for Marlene to bond with her daughter because they got to spend time playing and learning together. Participating in the workshops gave Marlene a chance to focus on what her daughter observed and learned during the math activities, while prioritizing communication and interactions with her.

"I think our relationship was strengthened because I got to share and work more with her. I think that working with her motivates me the most to spend time with her. Sometimes, as parents, we work and don't dedicate time to our children. I think she and I have excellent chemistry during the workshop. The workshops are teaching us a lot. We're paying more attention to what she sees, hears, and learns," she said in Spanish.

Noticing math all around them

Marlene described how the workshops have helped her become more attuned to the learning opportunities that exist around her. For example, she incorporated counting items while doing everyday tasks, such as washing dishes. Marlene noted that conversations like this weren't as common before attending the workshops.

"Do you know what I have learned? That mathematics is not just mathematics," she said. "Two things are included: numbers and reading. I thought that mathematics was just numbers, but I have realized that both math and reading are used together."

Marlene shared how in addition to helping them notice math all around them, she and her daughter also spend more time talking to each other. "It has helped us a little more in math. For example, the workshops that we have done have also helped us with patterns. Also measuring, we have learned that. I think we have learned to have a bit more communication. Aside from math, I think there is a lot of speaking."

Embracing her role as her daughter's teacher

One of the biggest impacts that the workshop made on Marlene was helping her realize her role as a teacher for her daughter. She recognized that importance of teaching her daughter through interacting, talking, and playing, and she feels more confident in doing so. Marlene also became more aware of including math in the conversations she was already having with her daughter.

"Do you know what has changed the most? I always talked to her a lot, but now I teach her too," she said. "That's what I learned. It's not just talking to her. We have to teach her what she has to learn, not just [talk about it]. The workshops have helped us a lot. We already had communication, and I think we have more now when teaching her math."

Adapting activities for home use

Marlene took notes during the workshops and thought of ways to use the activities at home, sometimes adding her own modifications. She found new ways to incorporate aspects of the workshops into their everyday routines using materials that they already had around their home.

""We started saving cardboard toilet paper rolls to make shapes," she said. "We mark the toilet paper rolls with 1, 2, 3, and 4. We also stick some farm animal stickers on to the toilet paper rolls, and my daughter counts how many cows, calves, and pigs there are. We glued rolls together to make a rectangle and paint them different colors. I realized there are many things we can do with what we have at home. Items that we usually see as disposable end up being really useful for our children."

Improvement in child's math skills

Marlene noticed that her daughter became more skilled at counting, number recognition, and basic addition. Marlene's daughter has also gained more practice with patterns, using the activities from the workshop. Marlene believes that the addition of color and shapes make learning math more fun for her daughter.

"My daughter is learning how to count, recognize numbers, and add," she said. "For example, I can now tell her that 1 + 1 = 2. I want to start including numbers in the things that we are playing so she learns because we are just saying, '1, 2, 3, and this one is next,' and so forth. Nevertheless we are giving representations of the numbers to help her recognize them."

Growth in child's interest in math

Marlene noticed that her daughter is more interested in doing math activities, especially the ones from the workshop. Her daughter also initiates conversations that include numbers.

"Before, my daughter wouldn't ask to do activities with us," she said. "Now I see she has been asking us to sit down with her to do the activities that are out on her table. We went out for dinner the other night and she said, 'I had one hamburger.' I asked her 'How many fries did you eat?' and she said, 'I had 8 or 9.'"

Sense of community

Marlene enjoyed learning from other families in the workshops. Seeing other families engaging with the facilitator encouraged her to actively participate.

"I really liked the workshops every week and seeing families that are really interested," she said. "I saw the parents and children really enjoy participating. Sometimes we remained quiet, and I'm not sure if it was out of fear that we were going to make a mistake, but I started to see that if you do not speak, you won't learn, and you must speak to understand."

Rosalba

Embracing quality time and becoming her daughter's first teacher

Rosalba's experience

Rosalba joined the FCL workshops because she wanted to include math in everyday routines at home to ensure that her daughter had a strong foundation and positive attitude toward math. As a busy working mom, Rosalba learned how to include fun learning opportunities that sustained her daughter's interest, which also allowed them to share more quality time on the weekends. The workshops helped Rosalba transform everyday activities into opportunities to learn math in exciting ways that her daughter enjoys, illustrating how Rosalba became more attuned to the ways her daughter enjoys learning. The workshops increased Rosalba's daughter's confidence and interest in math, extending to her conversations and activities with her older brother.

Background

Rosalba is mother to two children (ages 13 and 5). A child of Mexican immigrants, she grew up in the United States and graduated from high school in California. Rosalba was motivated to join the FCL workshops by her desire to learn new things, figure out new ways to bond with her daughter, find new activities, and receive support on how and what to teach her daughter. Rosalba struggled with math when she was younger. She did not enjoy it and found it confusing the more she tried to learn. This inspired her to make sure that her daughter feels differently about math.

"My daughter likes math," she said. "Because I know I struggled a lot during high school, I try to help her get the concept of math early on. When we're eating or we're playing, I always say, 'OK, look, you have this much, add this, and now you make this much.'"

Rosalba was motivated to include math in everyday routines and activities with her child as part of her mission to ensure that her daughter has a strong foundation and positive attitude toward math.

"Math was really hard for me because my parents didn't have the time to teach me. I don't want her to struggle the way I did, so that's why I've tried to bring math into our routines. She can learn and also see that we are having fun."

Opportunities for family bonding

Rosalba enjoyed attending the workshops weekly because it gave her the chance to have some quality time with her daughter and gave them more things to talk about. She enjoyed supporting her daughter while working on the activities together, especially when the activities seemed a bit advanced for her child.

"Everything's so fun," she said. "I love the workshop because I have time to be with my daughter, see all the things that she can do, and see her follow directions. She's always so excited to do whatever they're doing in the workshop. I help her cut things because they only gave us a certain amount of time, and she takes forever [laughs]. I was cutting, and then she was gluing, so we did it together. The workshops are great for bonding because you're doing things together. Yes, it's one hour of her being next to me sitting down, because other than that time, she will run away and do other things. But during that hour, she's there the whole time with me."

One major thing Rosalba learned from the workshop series was the importance of spending time with her child. Even after the series ended, they continued to dedicate time together on the weekends to playing and learning together.

"I learned a lot of things," she said. "First, I learned to spend more time with her. Sometimes you are just busy with your day at work and there isn't always time. Well, I try to do it every Saturday, and I haven't stopped. Every Saturday we do activities for at least an hour, and I'm trying to keep this up every weekend so she can get used to doing this—spending time with me and just learning more."

Learning together with enthusiasm

Rosalba noticed that her daughter started coming to her for support with math and began seeing her as someone she could look to for guidance. Rosalba believed that her own enthusiasm for math helped her daughter become more interested and excited about learning. Knowing that her mom was also excited to learn with her fostered an environment where math became exciting and doable. Rosalba expressed pride at being able to be there for her daughter in a way she was not able to for her son.

"She sees my enthusiasm when I'm helping her. She sees that I'm really into it too. That I'm really there with her," Rosalba said. "I think that's the best because she knows there's someone with her all the time. I'm trying to help her learn more. Now with any questions that she has, she knows she can come to me and ask me, 'How much is this?' I want to cry when I see my daughter coming to me for support now. I feel really good because with my son, I couldn't do any of this because I didn't know I could help him that way. With her, everything's so different because I have more experience now in this program. Now I have the opportunity to learn more about how to help my kids."

Including math in everyday routines

The workshops helped Rosalba include math in their everyday interactions with each other, and helped her see that math is all around them. She feels more aware of existing opportunities to insert math in playful ways at home.

"When we're doing things like folding clothes, she'll separate clothes by color, and she will pile the black clothes on one side, and then she's like, 'This is what they told me to do. Oh, this is what I learned.' She's learning a lot," Rosalba said. "Let's say we were cleaning up the house. Before, I would just let her help me, but we wouldn't talk a lot. We would just clean, throw everything away, and that's it. But now, I know there's math everywhere. That's what I've been learning from the workshops that you can do math with anything."

New strategies for teaching math

The FCL workshops helped Rosalba find new ways to teach math at home that are fun and engaging. She found herself transforming everyday activities into opportunities to learn math. She began to feel comfortable supporting her daughter at her current stage of math when it can include many aspects of play.

"I think the workshops have helped because I know a little bit more about how to help her not get bored of doing math," she said. "It gives me more ideas. I think this workshop is helping me learn and use my daily activities to transform them into math problems so that she can learn. I know, right now, it's really easy, but in the future, it will get harder and harder. Right now, I'm comfortable teaching her math by playing with her."

Another strategy Rosalba picked up from the workshops was using physical items, like pieces of cereal, to solidify math concepts. She learned that her daughter responded well to manipulating items with her hands rather than just seeing numbers on paper. Rosalba got the idea to use physical objects to illustrate addition to her daughter, realizing that seeing the items and counting them out has been more helpful in getting her daughter to understand the concept. The FCL helped Rosalba find different ways of exploring math that include more creativity and fun, allowing her to think innovatively about how to create more learning opportunities at home.

"The workshops gave me a lot of ideas about how to make learning fun and entertain my daughter that way," she said. "Now when I go to the craft section, I look for materials like construction paper that can be used for learning. Before, I didn't even try to do that. Now it's more like, 'The workshops showed me how to do this, now I'm going to try with these other items.' I'm learning new things and learning or thinking more beyond what I knew. They showed me a lot of new steps to try to help her have fun and learn at the same time. I'm really bad at making or doing things like that, and they really helped me. They showed me that it's really simple. Just with simple things you can play a math game or just use different things so they can be more interested in playing with you or doing activities."

Growth in child's math awareness and interest

Rosalba's daughter started having more fun with math and initiating more activities on her own, suggesting that the workshops may have sparked an interest in math that she wants to continue developing. Rosalba noticed that these types of activities were occurring with more frequency compared to before the FCL workshops.

"Now she says, 'Mom, let's play,' and then she grabs whatever she can find, like colored pencils, and starts counting," Rosalba said. "She's been learning a lot about sorting and putting things together that go together. She wants to start activities on her own now. Now that she's learning about money value, she goes around the house and looks for coins. Then she starts counting the coins to figure out how much money she has. Then she's like, 'OK, let's go to the store. I'm going to buy this and this with this much money.'"

Her daughter started including math in her activities and successfully finds ways to do so. Her awareness of her environment has grown, and she is actively searching for ways to practice math in fun ways.

"She tries to include math in almost everything," Rosalba said. "When she's walking, she's counting the lines. I think the workshops are making her think more about numbers and more about math. Now she sees everything as a math activity."

Growth in child's math enjoyment

The workshops have helped Rosalba's daughter see that learning math extends beyond doing homework and can include playful interactions with her mother and brother.

"Our feelings of enjoyment of math have changed for me and for her too," she said. "Now that she knows it's fun, that's not just homework. I tell her, 'This is math, you need it everywhere.' The activity that my daughter and I loved the most was making puppets because we tried to make a butterfly. That one was the one that we enjoyed most because it came with those little eyes and everything. It was more animated because they give you those little eyes. When you move the puppet, the eyes will move. It was really pretty. We still have it."

During the last interview, Rosalba shared that her children were in the kitchen baking together and that she could hear them practicing measuring and counting, demonstrating how natural it became for her daughter to include math in her everyday conversations.

"Right now, they're baking a brownie," she described. "My daughter likes to help her brother. Both of my kids love to cook. My son told her, 'Okay, we need 1 cup of milk.' We have a measuring cup, so she tried to pour the milk, then she counted out the eggs. They did it together. I think the brownie is already done. I can smell it from way over here."

Conclusion

The Family Math “Peg + Cat” FCL case study provided an in-depth exploration into three families' experiences as they participated in an interactive family workshop series and became equipped with the skills and resources to support their child's learning of math at home through playful interactions and conversations.

Liliana, Marlene, and Rosalba each realized they had the skills and tools to be their child's teacher at home. As their children began looking to them for more help with math, the mothers were proud that they could help them in ways they had not thought of before. The parents' enthusiasm for learning became contagious, fostering an environment where math became exciting and doable. Workshop activities helped families see that math could extend beyond homework assignments and just numbers. The families also realized that math could be playfully included in their daily routines of cooking, folding laundry, and going on walks.

They recognized the importance of teaching through interacting, talking, and playing. The workshops served as a dedicated time to learn and play together, inspiring families to keep the fun going even after the series ended. Parents enjoyed the quality time together, which strengthened their relationship with their children, and helped them see that being present and engaged is one of the best things they can do.

Children who participated in the FCL were more excited and engaged when it came to doing math at home. They also became more excited about and aware of math opportunities around them. Children began actively searching for ways to practice math in fun ways, such as when baking or cleaning up their toys. They demonstrated improved number recognition, stronger counting skills, sorting skills, and pattern recognition. Their parents noted that they saw their children continuing to practice what they learned. The children also initiated math activities on their own, suggesting that the workshops sparked a new interest in learning math with their parents.