

Exploring Parent Learning and Growth in a Family Workshop Series

A Case Study of Three Moms in the PBS SoCal Family Math Parent Academy



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Study Overview



The case study explores powerful stories depicting three mothers' transformative experiences as they went through the parent academy.

The Family Math Parent Academy is a workshop series that offers an in-depth experience for adult caregivers to learn how to embed math learning into their everyday interactions with their children and model playful learning. The five-week program brings parents and caregivers together once per week to learn about early math concepts such as sorting, counting, patterns, spatial sense, and shapes. This family engagement series offers a chance for parents and caregivers to build their self-efficacy, positivity, and confidence around math.

The purpose of the case study was to explore parent math attitudes, behaviors and beliefs over the course of the Family Math Parent Academy experience. We wanted to further understand how families engage in math at home with their children, while also exploring how a workshop series designed to highlight how everyday routines and activities at home can serve as math learning opportunities might influence parent attitudes and identities as math thinkers and doers. We explored how parent participation in a family workshop series could be related to changes in children's interest in and enjoyment of math at home.

We conducted in-depth longitudinal interviews with three parents who joined the Parent Academy in the fall of 2022. Interviews took place before the Parent Academy started; in the middle of the series; and a few weeks after the series was completed. Throughout the interviews, we heard powerful stories depicting these mothers' transformative experiences as they went through the Parent Academy.

Joy's Journey

Intentional and seamless integration of math

About Joy

A stay-at-home mother of two children (3, 5), she immigrated from Nigeria and holds a professional degree.

Personal History With Math

Joy had a dislike of math from a young age but recognizes that enjoyment of math is crucial for children's success.

Joy's Motivations

Joy believed she had an inherent responsibility to ensure her children learned math.

She wanted to undo her negative math attitudes and see math as more enjoyable.

She knew a strong foundation in math was crucial for her children's future success and happiness.

Joy's Growth

DESIRE TO CELEBRATE MATH

Joy desired to create a home environment where math was celebrated and enjoyed despite her dislike of math.



INTENTIONAL INTEGRATION

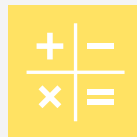
Joy initiated math conversations at home with her children and seamlessly integrated math into everyday routines, like cooking and laundry.

Positive Outcomes



MATH CONFIDENCE

Joy experienced growth in her confidence in being able to support her children at any stage of math.



MATH IS EVERYWHERE

Joy started seeing opportunities for learning math all around her.



FAMILY BONDING

Joy purposefully initiated math activities and crafts for her family to do together.



HUNGER TO LEARN

Joy reignited her relationship with learning, and her curiosity to keep seeking resources grew.



MATH ENGAGEMENT

Joy's children showed greater interest and engagement in math activities at home.



SKILLS IMPROVEMENT

Joy's children displayed more number awareness and recognition that math was all around them.



PARENT-CHILD BONDING

Joy's children engaged in more frequent, enhanced, and creative interactions with her.



SOCIALIZING

Joy's children enjoyed the chance to socialize with and learn from other families during the workshops.

Impact on Joy's Children

Joy's Journey

Intentional and Seamless Integration of Math

Background

Born and raised in Nigeria, Joy holds a professional degree in optometry. She worked as an optometrist in Nigeria but had to give up practicing after she moved to the United States. Her 5-year-old son and 3-year-old daughter were both born in the U.S. Currently, she is a stay-at-home mom.

Personal history with math

Joy's dislike of math started at a young age and continued to worsen into her teenage years as math became more challenging. She described how she knows math is important but she simply has no enjoyment for it. She wanted to ensure that her children do not feel as she does about math and hoped they experience enjoyment of and interest in math.

Joy's motivations

Sense of inherent parental responsibility to teach math

Undoing her own negative math attitudes

Desire for her children's success and happiness

Although Joy did not characterize herself as a math person or math lover, she recognized the universality and importance of it. She saw it as her **inherent duty and responsibility** as a parent to support the math skills of her children to help them succeed in life. Another motivation was to ensure that her **children love math more than she did growing up**. Even though she did not find math interesting or fun, she hoped her children would feel differently. Joy was motivated by her desire to **prepare her children for success and happiness in life**. She directly tied her children's future success with a strong foundation in early math skills, recognizing that any career they chose would require math.

"[Teaching math to my children] comes naturally because it is something that I must do," she said. "As parents, you want your children to do better than you. You want them to go further than you have gone in life. I see it as my responsibility. I see that I do not have a choice, I don't have an option, I must teach them. It's not a burden. I do it because it is something I want to do because I don't want them to be like me."

Evolvement of Joy's intentionality to include math at home

One of the most defining aspects of Joy's journey through the Parent Academy became her newfound resolve to purposefully create meaningful opportunities for her two children to engage in learning math at home. Joy described how other elements of math began manifesting in her daily tasks with her children. For example, she shared how her son became curious about how to measure ingredients when baking a cake, which led to a discussion about how measuring spoons hold different amounts of ingredients.

"When cooking, I always involve them, but now realizing that we could be learning math makes me see that I need to push further," she said. "This whole workshop series has made me more intentional in everything I do. When we're sorting out laundry, I call both of them, and the first thing I usually ask them is, 'This is math, right?' They'll be like, 'Yes.' When we are sorting laundry, my daughter loves to sort her clothes by colors. The workshops have made all three of us now more intentional. These are the things we used to do before. Before, we used to sort out laundry, we used to make meals, but now it's more interesting because we remind ourselves that this is math."

Joy had always involved her children in everyday tasks, but the Parent Academy helped her realize that their involvement could serve as learning opportunities for math.

"For me, the past couple of weeks has made me more intentional in terms of math, especially incorporating it in our daily activities at home. For instance, whenever we make some eggs, I make sure that [my son] counts the eggs and I make sure that the younger one is right next to him to watch. It has made me more intentional," she said.

Joy started pointing out to her children how math fit into their everyday tasks to identify that they were practicing math together. As Joy progressed through the Parent Academy, she shared how math became seamlessly woven into their everyday lives. She described a shift in how she previously set the intention of each activity by telling her children they were doing math to now realizing that they were easily including it in their everyday conversations and routines without labeling it as math.

"The beauty of it all is that we are enjoying math, even when it doesn't feel like we are learning. It just feels like our regular lives, like our daily lives, our daily activities. We're just doing it. A lot of times I'm doing it without them even knowing," she said.

Evolvement of Joy's confidence

Joy's confidence in teaching her children math grew as she participated in the Parent Academy. She started to feel less scared of math and felt more confident about doing math with her children. She believed that the workshop helped change her view of math in the long term. Joy's mindset shifted, allowing her to view math as something that is more doable and accessible.

"My confidence level has gone up," she said. "I teach them confidently and I'm very positive that, going forward, things will get better. I have learned a lot and I have worked on myself the past few months. Basically, I've learned to be positive. I used to fear math as a child, but now I am positive and I'm confident that I can pull through. We can do it together with my kids. Even when we get to the advanced stage, we can do it together."

More opportunities for family bonding

Prior to the Parent Academy, Joy's family did not engage in many crafts together as a family unless it was an assignment that her son received from school. However, the activities and strategies from the Parent Academy helped her family be more creative with materials that they had lying around the house. Joy's family became inspired to build houses and identify the shapes they made with cardboard delivery boxes. Joy also began including her daughter in more routines that involve math such as measuring ingredients while baking, counting items while unpacking groceries, and using the PBS SoCal tangram activity. The workshops helped her see that her daughter could learn math, too, even though she's only 3. Working on math activities together and having enhanced conversations surrounding math in their everyday routines became opportunities for bonding in Joy's family.

Increased curiosity and hunger to learn more

Joy described herself as restarting her relationship with math after joining the Parent Academy because it reignited her love for learning. Joy hopes to keep learning more, even as math becomes more challenging when her children reach more advanced stages. She is prepared to seek out resources to ensure her children have what they need to succeed.

Impact on Joy's children

Joy's children also experienced positive outcomes from their participation alongside their mother in the Parent Academy. They were excited to contribute to the workshop and participate in the activities with other children. They became more interested in and more excited about math, likely because of Joy being more intentional with including math in everyday routines and behaviors. She recognized that her daughter's counting skills improved since joining the Parent Academy, noticing that she used more opportunities to count her food, stairs, steps, stop signs, and other items on a daily basis. Her children became more aware of math in their everyday lives and were doing math when cooking with their mom or sorting their laundry by colors.

Luci's Journey

Gaining self-efficacy to become her children's first teacher

About Luci

A mother of two children (1, 5), she immigrated from a village in Chiapas, Mexico. Luci has no formal education beyond primary school.

Personal History With Math

Luci has low confidence when it comes to teaching her children math because of her limited math education and knowledge.

Luci's Motivations

Luci wanted to take advantage of educational opportunities for her children.

She believed she has the responsibility as a parent to ensure her children are learning.

She yearned to be a positive role model to encourage a love for learning.

Luci's Growth

INTIMIDATED BY MATH

Luci sought resources because she felt intimidated by math and ashamed of her limited math knowledge.



CHILDREN'S FIRST TEACHER

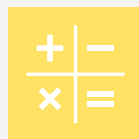
Luci changed her relationship with math and developed the self-efficacy and motivation to be her children's first teacher.

Positive Outcomes



MATH CONFIDENCE

Luci experienced a growth in confidence and pride in her ability to teach her kids math.



MATH IS EVERYWHERE

Luci recognized and included math in everyday routines, such as when sorting laundry.



BEING A ROLE MODEL

Luci started setting an example and inspiring her kids to learn.



HUNGER TO LEARN

Luci had an increased curiosity and hunger to continue learning beyond the Parent Academy.



MATH ENGAGEMENT

Luci's daughter initiated more math activities and became excited to talk about math at home.

Impact on Luci's Children



SKILLS IMPROVEMENT

Luci's daughter became more confident doing math at home and was more willing to practice writing numbers.



MOTIVATION TO LEARN

Luci's daughter became more motivated and more energetic to learn.

Luci's Journey

Gaining self-efficacy to become her children's first teacher

Background

Born in Chiapas Mexico, Luci grew up in a village with limited resources and opportunities. She did not receive a formal education, leaving school before her first year of elementary school was over. She has a 5-year-old daughter and 1-year-old son.

Personal history with math

Luci's lack of formal schooling when she was younger shaped her perspective on math, especially when it came to being able to support her children with early math skills, leaving her with low confidence and uncertainty in how to support her children's foundational math skills.

Luci's motivations

Take advantage of educational opportunities for her children

Sense of parent responsibility to ensure children keep learning

Be a positive role model to encourage a love for learning

Luci was motivated to join the parent academy by her desire to **take advantage of opportunities that she did not have growing up** due to lack of formal schooling and other priorities in her family. She believed that opportunities like the Parent Academy would help her children have a better future. She also described being bound to her sense of **parental duty and responsibility** to ensure her children keep learning. Luci is also driven by her desire to be a **role model for her children** to encourage a lifelong love of learning.

"In my little town, they didn't have that education. I really had no knowledge of math, reading or anything like that," she said in Spanish. "I didn't even make it halfway through the first year of elementary school. I grew up in a faraway village, and there weren't many resources available, but then I came [to the U.S.] to find a different lifestyle and many opportunities, which unfortunately I couldn't have back then because my parents were never involved with me, and I didn't know about [these opportunities] either."

Evolvement of math confidence and self-efficacy

Luci's limited formal education in math made her feel ashamed in the past, leading her to think that it hindered her ability to understand or perform even simple tasks that involved math. She acknowledged her own previous misconception that if she didn't know math, then she couldn't do anything at all. Since joining the parent academy, she believed she was able to fill in some gaps in her math knowledge, making her feel more confident in herself.

"Before, I used to be very intimidated by math, and I was feeling less than others because they knew more," she said. "Now that I'm going to all these PBS SoCal workshops, I have been picking up a bit. Some things have affected me and made me realize I had the misconception of, 'Oh, I don't know math. There's nothing else I can do. I'm nothing,' and now I know it's not like that."

Realizing she is her daughter's first teacher

As the Parent Academy progressed, Luci felt less intimidated by math and no longer ashamed when it came to math because she found herself learning and picking up math in the workshops. She realized that by taking advantage of resources designed for parents, she was changing her relationship with and attitude toward math. Luci's sense of self-efficacy grew as her relationship with math improved and she became proud of herself for being more involved in her daughter's math activities. She grew in her ability to support her daughter's success at school, which led to feelings of accomplishment and pride. She was also motivated by her desire to set an example for her daughter. She hoped if her daughter saw that she was motivated to learn, then her daughter would also want to learn.

Ever since Luci and her daughter began engaging in math-focused activities and conversations at home, Luci noticed a shift in how she and her daughter perceived learning at home. One memorable moment was when Luci's daughter acknowledged that her mom was her first teacher, sharing how she felt motivated to learn because of her mom, which helped Luci realize how important of a role she played in helping her daughter build the skills she needs for a good foundation in school.

"Yesterday, my daughter told me while she was taking a bath, 'Mommy, thank you. You are my first teacher because you motivate me and teach me.' It made me think, 'Wow.' As parents, we are the first teachers of our children. The second ones are the schoolteachers," she said.

The Parent Academy provided Luci with renewed energy to motivate her daughter to learn. As she began to see herself as her daughter's first teacher and someone her daughter looked up to as a role model, she challenged her old notions that learning only happens in school.

"Had I not been in the Parent Academy, I wouldn't have been able to motivate her to have that energy and that motivation to learn. As I said, I'm her first teacher, someone to look up to and motivate her," she said. "I like to get involved in what my children do because it's part of their development, but my role is to provide knowledge to them as well. I admire myself as a mother and I feel very proud that I can do this now."

Weaving math into everyday routines and activities

Over the course of the Parent Academy, Luci and her family started recognizing math in everyday situations at home. One instance involved sorting while doing laundry: They sorted their clothes into piles of black clothes and colorful clothes. Luci described how even though laundry was something she did before, she had not previously thought of the task as math. Now, she feels motivated to emphasize the sorting aspect to her children.

"Something that I am doing more of is that we separate our clothes by colors. My daughter has her basket and I tell her, 'OK, grab your clothes, my love. Put the dirty clothes in, but now we are going to use another basket. This one is for the black clothes, and the colored clothes go in the other one.' My daughter asked me, 'Where do you learn these things from, Mommy? I like it.'"

Luci's realization that math is all around them helped create rich conversations between her and her daughter, fostering a deeper bond. They began reading more books together and spent more time together as a result of their enhanced conversations and activities they did involving math. Luci shared how she started noticing that everything around her could involve math, picking up on any opportunities to talk about math with her daughter. Through these conversations, she knew she was encouraging her daughter to learn.

"Everything around us, everything is math. Sometimes I didn't even take the time to realize that," she said. "Now we talk and chat constantly instead of just looking at my phone. In every corner, in every space, anything could be related to math at home. Everything around us involves math, and sometimes we don't realize we're stimulating them by talking to them about it."

Impact on Luci's children

Luci noticed that her daughter displayed more energy and motivation to learn at home. She realized that her own hunger to learn may have played a part in her child feeling the same way. Luci's daughter initiated more math activities at home, appearing to be more confident in her own math skills. On occasion, Luci's daughter noticed that her mother was more involved in the activities they did together, which helped her become more engaged and interested in math.

Luci's daughter became more interested in math and numbers as well, which Luci felt was a direct result of her participation in the program. Because Luci started talking about numbers more frequently, her daughter became more interested in writing them down. Her daughter was excited to practice what Luci was learning from the academy. Luci also saw an increased confidence and independence in her daughter when it came to learning.

"I see that she is motivated, that she wants to learn. She wants me to motivate her, or sometimes she wants to do it on her own, and then come tell me about it. Attending the Parent Academy and the changes I have made at home is something that has given her confidence and independence," she said.

Flor's Journey

Growing into a confident math thinker and doer

About Flor

A mother of two (6, 14), Flor immigrated from a small town in Guatemala. She has no formal education beyond first grade.

Personal History With Math

Not having background math knowledge shaped how Flor saw her role in helping her children with math. She often was ashamed and embarrassed when it came to basic math tasks. Unable to help her son with math when he was younger, she focused on finding ways to now support her daughter.

Flor's Motivations

Flor felt a responsibility to be involved in her daughter's learning.

She had a desire to overcome insecurities around her lack of math knowledge.

She wanted to understand how best to support her daughter in math without struggling.

Flor's Growth

UNSURE HOW TO BE INVOLVED

Flor struggled with being able to support her daughter's math learning at home because she felt she didn't know enough to be involved.



ENCOURAGE BY LEARNING TOGETHER

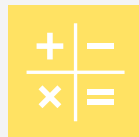
Flor realized she could play an important role in teaching and encouraging her daughter by learning together with her.

Positive Outcomes



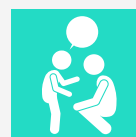
MATH PLAYFULNESS

Flor began supporting math learning at home in creative and playful ways.



MATH IS EVERYWHERE

Everyday routines became opportunities to talk about math, such as practicing spatial sense in the park.



GREATER INVOLVEMENT

Flor found it easier to be involved in helping her daughter learn math.



HUNGER TO LEARN

Flor gained the confidence to continue learning math after the Parent Academy.



PERSEVERANCE

Flor's daughter had lessened math anxiety and more perseverance to complete math assignments.

Impact on Flor's Children



MATH POSITIVITY

Flor's daughter changed her relationship with math, seeing math as something simple and not intimidating.



MOTIVATION TO LEARN

Flor's daughter showed a deeper focus and motivation to learn math.

Flor's Journey

Growing into a confident math thinker and doer

Background

Flor grew up in Guatemala. She left school before completing the first grade to help take care of her younger siblings, who eventually numbered 17. When Flor moved to the U.S., she barely knew how to count to 10. Not having a formal math education shaped her perception of herself and her abilities as a parent. She has a 6-year-old daughter and a 14-year-old son.

Personal history with math

Flor did not like math because she never had the opportunity to learn more about it due to the fact that girls in her village were discouraged from receiving an education. She explained how her childhood experiences differ from those of her children because she strives to actively support their learning. Flor experienced feelings of embarrassment and shame that she did not have basic math skills everyone else around her seemed to have.

Flor's motivations

Sense of parent responsibility to be involved in her children's learning

Desire to overcome insecurities around lack of math knowledge

Understand how best to support her daughter in math without struggling

When Flor joined the Family Math Parent Academy, she was excited to start **being more involved in her daughter's learning of math**. Flor was also motivated by her desire to figure out ways to continue practicing math outside of school to maintain her daughter's momentum of learning at school. She expressed gratitude for the program, which she saw as helping her **overcome her insecurities with math**. Flor also wanted to help her daughter with math and not struggle so much to **understand how best to help her**. She felt that her background with math made it challenging for her to support her daughter's learning, and she hoped the Parent Academy would help her find some easy methods.

"It was very difficult, and when I arrived in this country, I didn't even know how to count from one to 10," she said in Spanish. "I have a friend in Mexico who taught me how to use my fingers to count. And yes, now I've learned, thank God. The first few months [of being in the U.S.] were difficult for me, but I've been getting along now, but it was difficult due to not learning things in my country. When [anyone asks me about math], I just stand there and say, 'I don't know.' I used to say, 'I don't know. Don't ask me. I can't,' and I was just perplexed. Sometimes my face would turn red, maybe from shame."

Becoming her daughter's teacher at home

Flor's limited education in math shaped her view of herself as a doer and thinker of math. She described feeling embarrassed when her older child counted and she couldn't count along with him. Flor also realized she was struggling to help her daughter with math and wanted to try to overcome this barrier by learning new strategies in the Parent Academy. Since participating in the Parent Academy, Flor experienced a shift in her thinking around math, specifically in regard to her role in teaching her daughter. Previously, she thought of school as her daughter's primary teacher but later realized that she plays an important role in teaching at home.

Learning and working together helped her daughter overcome her fears and anxiety around math, because Flor took on the role of encouraging her and showing her that math doesn't have to be something to fear. Flor finally felt that she was able to support her daughter in the way she always wanted to.

"It was my wish to get involved in the Academy so it would not be so hard for me to support my girl. Being able to help my daughter and being able to do homework, being able to do math together, without confusion or seeing that it is difficult, has had a great impact on me. My daughter also sees that I am supporting her, so that helps her see that math is not too complicated. She sometimes seems afraid of math or hesitant to do her assignments. But now that we both try to do her assignments together, she sees that it is possible to solve the problems," she said.

Innovative thinking and creativity with math

Attending the Parent Academy transformed how Flor thought about math, allowing her to think innovatively about how she could support her daughter's learning in new ways at home. For example, Flor and her daughter practiced spatial sense vocabulary during walks in the park. Flor recognized the importance of her role in introducing words like "under" and "above" and how it helped her daughter use them on her own. The workshops also introduced Flor to how spatial vocabulary is foundational for more advanced math, motivating her to figure out ways to use these words during their everyday activities.

"When we were walking in the park, I told my daughter, 'If I'm lying here, I'm under the tree, and if I'm here, I'm above the tree,'" she said. "She is learning because sometimes she comes home from school and says, 'I am above the tree, I am under the tree.' It's very simple sometimes, but that is really going to help form the base for skills that will later be used in geometry and in more advanced mathematics. These are basic principles, being able to describe where we are in space, like, 'I am sitting, it is next to me or behind.' We even use it when we drive and when we give directions to someone, to the left or to the right."

Evolvement of Flor's confidence and sense of pride

The Parent Academy helped Flor understand the importance of math and how it didn't need to be as complicated as she once thought. Before, Flor hesitated to answer questions related to math because she felt embarrassed when she didn't know how to do something. After the Parent Academy, Flor gained more of an open mind toward math. The workshops gave her the confidence to realize that math is not something she needs to avoid, helping her become open to learning instead of shutting the door on math. She began seeing ways that math could be fun when she realized doing math was as simple as playing with her child.

Flor's confidence in herself changed over the course of the Parent Academy. Flor didn't originally characterize herself as someone who had any confidence with math, but after a few weeks in the Academy, she grew more comfortable. She acknowledged that she still had so much to learn, recognizing the amount of energy and practice it took to make sure she internalized everything she had learned. Flor demonstrated pride in herself for attending the workshops and putting in the time and energy to learn to ultimately help her children. She enjoyed the praise she received from her family members and valued their recognition of her efforts. Flor began feeling less afraid of math and became more confident in her ability to do math.

"My confidence has changed a lot for me. As I said, I did not have that confidence with mathematics, and right now, I do feel comfortable. We still have a long way to go, and I always want to have that ability and that desire to continue learning about math, reading, and different things, but always be focused and not be discouraged," she said.

Impact on Flor's daughter

Flor noticed how her daughter began to see math as easier and less intimidating once Flor started supporting her more on her homework assignments. Flor's daughter stopped speaking negatively or fearfully about math and had a stronger belief in herself that she could complete her math assignments. Flor's daughter also demonstrated a deeper focus when she was working on her math homework and expressed a desire for better grades on her homework. With Flor's support and encouragement, her daughter started working extra hard on her homework assignments. Flor suggested her daughter's new attitude toward her math homework was a direct result of their working together.

"I have noticed a difference in her. Before, she said, 'Math is not for me.' She was very sincere because she is very honest in saying when she doesn't like something and when she does. She said, 'I don't like math because it is hard for me to get the answer,' and I told her, 'Look, it's easy, do it like this.' Now I hear her saying, 'Oh, yes I can do it. Yes, I want to.' I've seen the difference because, at first, she did not want to do things by herself. I think in the past we were not focused on her learning as much, but now I am, and I have seen the improvement. I was even surprised because this week as soon as they gave us the grade report, she did so much better. Her teachers congratulated me, and they told me to continue supporting her," Flor said.

Conclusion

The Family Math Parent Academy case study provided an in-depth exploration into three mothers' transformative experiences as they participated in a family workshop series and became equipped with the confidence and skills to support their children's learning of math at home through playful interactions and conversations. All three of the parents in the case study had compelling motivations for joining the weekly workshops, allowing us to explore how each of them fulfilled her desire to contribute to her children's happiness and success in math. Joy, Luci, and Flor became more confident about doing math with their children, realizing how simple and easy it was to fit math into their existing routines.

Parents suggested that the sense of community within the parent academy contributed to their positive experiences, noting how the environment, charisma of the facilitators, and ability to observe and share with other parents gave them a sense of belonging and camaraderie. We also learned how the mothers believed that their participation in the academy was connected to growth in their children's excitement, interest, and motivation with math at home. After participating in the Family Math Parent Academy, all three of the families started recognizing math in everyday situations at home, realizing that math was all around them, creating rich conversations and opportunities for family bonding.
