GOODMAN RESEARCH GROUP, INC.
Program Evaluation • Consultation • Market Research

Young Mathematicians-Worcester
Final Evaluation Report

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EXECUTIVE SUMMARY

Young Mathematicians in Worcester (YM-W) is an initiative "to transform the way that educators and families interact with children around math – making it a common and doable family activity." The initiative is led by EDC in partnership with Worcester Child Development Head Start, Worcester Family Partnership, Worcester Public Libraries, and Quinsigamond Community College. YM-W was one of two Family Math Roadmap Implementation Project Learning Community Grants funded for two years (2019-2021) by the Heising-Simons Foundation and the Overdeck Family Foundation. EDC currently has a planning grant from the HeisingSimons Foundation to sustain and expand the YM-W work.

GRG's external evaluation of YM-W was been designed to provide the project team and funders with actionable evidence of progress and results. Key evaluation activities included annual pre-post surveys and interviews with educators, an annual year-end survey of parents, annual focus groups with the project's Family Math Leaders, and annual mid-year interviews with partners.

KEY FINDINGS

The YM-W project made remarkable progress in carrying out its project development, implementation, and activities, as proposed, especially in light of the COVID-19 public health crisis. The partnership itself was meaningful and strong; the professional learning sessions and resources for educators were valuable; the family math materials were helpful; the family math leaders group was active and inspiring; the family math website was improved; and dissemination of the work is well underway.

The partnership promoted an increased understanding of the importance of math for families and families showed increased interest in and knowledge of early math, increased comfort helping their children with math, and an improved ability to come up with fun math activities to do with their children. Parents also reported the YM-W materials helped them feel less anxious about helping their children with math.

The partnership also promoted an increased understanding of the importance of math for educators and educators also showed increased interest in early math, and increased comfort engaging in math with young children and supporting family math. In some cases, educators' beliefs about early math also improved, for instance, growing in their understanding that everyone can learn math and that young children are curious about math ideas. There was also a trend for the frequency of educators including math in their teaching to increase from the first to the second year of the program.

Educators also grew in their confidence supporting families to engage their children in math at home. They showed increased confidence helping parents understand children's age-appropriate math skills and answering their questions about early math activities, were more confident about the best ways to share math information with parents and connect families to resources that can support children's math development, and were more confident about knowing the best practices and having the right tools for engaging families in the virtual environment. Educators also demonstrated increased knowledge of children's development of number concepts.

While we were limited in our study of the extent to which the partnership promoted children's math learning, educators clearly believed the program mitigated the risks to children's learning posed by the pandemic, and in some ways strengthened family math engagement and learning.

Finally, a majority of educators were extremely likely to recommend the YM-W program to a colleague, and a majority of parents were promoters of family math talk.

Next steps for the YM-W partnership include expanding the family math learning community partnership across Worcester. The evaluation helped demonstrate opportunities to build capacity for family math in the YWCA/YMCA, local businesses, clinics/WICs, and non-profits. It also demonstrated parents' beliefs that community support for family math is important and desired.

INTRODUCTION

YOUNG MATHEMATICIANS IN WORCESTER (YM-W)

Young Mathematicians in Worcester (YM-W) is an initiative "to transform the way that educators and families interact with children around math – making it a common and doable family activity"[1] and, ultimately, "for all children to see themselves as mathematics learners."[2] The YM-W initiative is led by Education Development Center (EDC)[3] in partnership with Worcester Child Development Head Start (Head Start), Worcester Family Partnership (WFP), Worcester Public Library (WPL), and Quinsigamond Community College (QCC). It builds on and scales up implementation of EDC's research-tested cross-context (home and school) family mathematics intervention: *Young Mathematicians* (YM).[4] YM uses games and problem-solving activities to support young children's foundational mathematics development in number sense, number relationships and operations, geometry, and beginning algebraic reasoning.

YM-W was one of two Family Math Roadmap Implementation Project Learning Community Grants funded for two years (2019-2021) by the Heising-Simons Foundation and the Overdeck Family Foundation, "with the goal of illuminating the practices and benefits of a community-wide approach to Family Math."[5] EDC currently has a planning grant from the Heising-Simons Foundation to sustain and expand the YM-W work. This final evaluation report describes the initial two-year project's implementation and outcomes for participants.

GRG'S EVALUATION OF *THE YM-W PROJECT*

GRG's external evaluation of YM-W was designed to provide the project team and funders with actionable evidence of progress and results. The evaluation included both formative and summative components, tracking the implementation and unfolding of the program as well as documenting changes in participants. The evaluation was guided by a series of questions presented in the next section of the report.

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[1] https://www.edc.org/young-mathematicians-worcester

[2] YM-W Forming a Math Learning Community Educator Information sheet

[3] The 6-person EDC team consists of two co-directors, a project manager, and three additional support staff.

[4] EDC was simultaneously working on and leveraging synergies with a grant from the NSF Discovery Research K-12 program to expand the YM model; that work took place in Lawrence, MA.

[5] https://overdeck.org/news-and-resources/article/why-we-funded-two-communities-that-bring-family-math-to-life/

Evaluation Activities

Evaluation activities included: annual pre-post surveys of educators; an annual year-end survey of parents; annual focus groups with the project's Family Math Leaders; and annual mid-year interviews with partners. These activities are described below. In addition, the evaluator attended monthly partner meetings and a sample of online professional learning sessions, observed a small number of remote teaching sessions, and hosted monthly evaluation check-ins with the EDC team.

Pre-post surveys of educators

In the project's first year, EDC developed baseline and post-training surveys of educators, which they administered via their Qualtrics survey platform in September 2019 (baseline) and in December 2019 (Cohort 1 post-training) and March 2020 (Cohort 2 post-training). GRG then developed a year-end survey in consultation with EDC and administered it to all cohorts between May and July 2020 via Qualtrics. The year-end survey encompassed the post-training survey questions for Cohorts 3 and 4, follow-up questions for Cohorts 1 and 2, and year-end questions for all cohorts.

In Year 2, in consultation with EDC, GRG revised the surveys used during Year 1 and administered beginning- and year-end surveys to all participating educators via Qualtrics. Across the two-year project, a total of 106 educators completed one or more surveys.

A total of 55 educators responded to both pre and post surveys in Year 2 and Exhibit 1 provides descriptive information about this group, which is similar to that of Year 1 respondents. The vast majority of educators were affiliated with the Head Start program, with similar numbers of lead and assistant teachers participating, about half of whom had a teaching certificate. Most of the WFP participants were playgroup facilitators. Participating educators had a good amount of experience in early childhood education, with nearly half of the group having more than 10 years of experience. About one-fifth had a Master's degree. A majority were White and nearly one-third were bilingual.

Exhibit 1
Characteristics of Year 2 Pre-Post Educator Survey Respondents

		WCDHS (N = 47)	WFP (N = 8)	TOTAL (N = 55)
Position	Lead teacher	21	N/A	21
	Teacher assistant/aide	18	N/A	18
	Coach	3	N/A	3
	Playgroup facilitator	N/A	3	3
	Home visitor	N/A	1	1
	Administrator	2	1	3
Years in ECE	Less than 1	1	0	1
	1-4	6	1	7
	5-10	10	2	12
	11-15	6	0	6
	16-20	5	1	6
	More than 20	12	2	14
	Unknown	7	2	9
Teaching certificate	Yes	22	0	22
	No	17	6	23
	Unknown	8	2	10
Education	High school, GED, or CDA	0	1	1
	Associate's degree	9	0	9
	Bachelor's degree	24	3	27
	Master's degree	9	2	11
	Unknown	5	2	7
Race/ethnicity	White	31	4	35
	Black	4	0	4
	Hispanic	4	2	6
	Asian	3	0	3
	Unknown	3	2	5
Bilingual	Yes	14	3	17
	No	28	3	31
	Unknown	3	2	5

Year-end survey of parents

In Year 1, GRG developed a year-end survey of parents in consultation with EDC and project partners. In July 2020, the Head Start partner texted an anonymous link to the survey, which was hosted on GRG's Qualtrics platform. One reminder was sent in early August before closing the survey, and 21 parents responded.

In Year 2, GRG and YM-W leadership and partners revised the year-end survey. The Head Start partner again texted an anonymous link to the survey and also mailed a reminder postcard containing the QR code and link to the survey. The WFP partner emailed a survey invitation and link to a sample of their parents. A total of 59 parents responded, and are described in Exhibit 2.

Three-quarters of respondents were people of color and about half spoke a language other than English at home. (The survey was offered in English and Spanish.) Half of the respondents had an associate's, a bachelor's, or a graduate degree, while the other half had either a high school education or had not completed high school. More than two-thirds had children entering Kindergarten in fall 2021; the rest were either entering public pre-K or continuing in Head Start or WFP. Some 45% of responding parents had heard about the YM-W program prior to receiving the survey.

Focus groups with Family Math Leaders

GRG developed protocols for the focus groups in consultation with EDC. In Year 1, GRG conducted the discussion during the last scheduled meeting online in May 2020. Four parents participated. In Year 2, the group took place online in January 2021, with seven parents in attendance.

Annual interviews with partners

GRG conducted annual mid-year interviews with partners via Zoom or telephone. In addition, GRG conducted an online survey of partners in August 2020. Seven of the nine partners responded.

Exhibit 2
Characteristics of Year 2 Parent Survey Respondents

		Number
Child's race/ethnicity	Latino or Hispanic	17
	White, non-Hispanic	12
	Black, non-Hispanic	12
	Asian	6
	Black, Hispanic	2
	American Indian	1
	White North African	1
	Did not respond	8
Primary language at home	English only	25
	Spanish	10
	Albanian	2
	Arabic	3
	Twi	3
	Urdu	2
	Bengali	1
	French	1
	Haitian Creole	1
	Japanese & Cantonese	1
	Mandarin	1
	Portuguese	1
	Did not respond	8
Highest level of education	Grade 1-11	4
	High school or GED	22
	Associate's degree	12
	Bachelor's degree	6
	Graduate degree	8
	Did not respond	7
Child status for 2021-2022 school year	Entering Kindergarten	33
	Continuing in Head Start	9
	Entering public Pre-K	4
	Continuing in WFP	2
	Not sure / Did not respond	11
Heard about YM-W program prior to survey	No	32
	Yes	26
	Did not respond	1

FINDINGS

The evaluation was guided by an overarching question and six corresponding questions. These questions are presented below, followed by findings organized by question.

Overarching question: To what extent is the project making progress in carrying out project development, implementation, and activities as proposed?

1. To what extent does the partnership promote an increased understanding of importance of math for families and an increase in family report of positive attitudes toward math?

2. To what extent does the partnership/program promote an increased understanding of the importance of early math and an increase in educator report of confidence and positive attitudes toward math? To what extent does the program increase the quality of educator's math instruction and family math engagement practices?

3. To what extent does the project increase educators' knowledge of math and math learning and reduce educator's math anxiety?

4. To what extent does the partnership promote children's math learning?

5. What is the Net Promoter Score for the family math learning community stakeholders?

6. To what extent does the family math learning community partnership (YM-Worcester) expand and connect children, families and educators to math learning and engagement opportunities?

To what extent did the project make progress in carrying out project development, implementation, and activities as proposed?

The YM-W partner organizations, their programs, and the children and families they serve were (and continue to be) deeply impacted by the COVID-19 public health crisis. For example, a report from the National Head Start Association[6] revealed that families experienced stressors ranging from economic instability to job loss to illness, and 72% of Head Start programs connected children and families to disability or mental health staff. Another critical challenge cited in the report was lack of access to basic technology; 60% of families lacked access to a computer for remote learning and engagement, and 28% of Head Start staff also lacked access. On average, Head Start programs experienced a 20% increase in the cost of operating amid the pandemic.

[6] https://www.nhsa.org/wp-content/uploads/2021/03/head_start_stands_1_4.pdf

For a majority of the two-year period with which this report is concerned (specifically from March 2020 to April 2021), all of the partner organizations shut their doors and began providing programming remotely. Despite this unprecedented disruption, the YM-W program continued implementation, adapting and innovating as necessary in order to accomplish many of its original activities as well as new activities to meet the needs of partners, children, and families. While perhaps less formal than originally envisioned, the program was able to realize its planned iterative design approach. Several program activities and practices ensured that feedback from participating educators and families was incorporated into ongoing program design.

Major YM-W activities accomplished between fall 2019 and fall 2021 included the partnership itself, professional learning sessions and resources for educators, family math materials, a family math leaders group, an updated website, and dissemination. Each of these is described below, along with feedback from the evaluation where applicable.

Partnership

Partners met on a monthly basis throughout the two-year project, first in person and then remotely as a result of the pandemic. Lead representatives from EDC, Head Start, WFP, QCC, and GRG regularly attended the meetings. In addition, two parent partners joined the team in Year 2 and were active and engaged participants.

Data collected from partners showed the YM-W collaborative relationship was very strong, demonstrating effectiveness on key research-tested criteria of successful collaborations. Partners had a shared vision for the work and were extremely committed, and leadership was highly respected. All partners felt that the project "continued on in a really meaningful way" despite the twin challenges of building closures and overwhelmed families. The team worked diligently to try to understand and implement best practices in the unparalleled environment.

Partners were remarkably pleased with the program's headway toward its intended outcomes for the partnership, educators, families, and children. The necessity to transition classroom activities to home actually brought the initiative closer to WFP's model, in particular. In addition, challenges WFP voiced during Year 1 – namely strategies for working with children younger than the original target age – were improved upon in Year 2. Head Start also reported process improvements over time, for example, stronger communication ensuring that the right staff members were attending the professional development. They also confirmed that the new Year 2 format was the "right amount" of professional development for staff.

While WPL did not participate in the project as planned during Year 1 due to staffing shortages as well as a major construction project, the organization was increasingly engaged in Year 2. After a series of three virtual "Stories in Math" sessions were met with mild success (in terms of attendance), the team pivoted to creating kits that were handed out to 100 families with young children who were picking up books curbside from branch libraries. Even with the materials provided in the kits, the WPL partner found she needed to reinforce that the point of the kits was for parents to use the materials with their children (as opposed to on their own, without an adult). In this way, she felt the effort was "as much about awareness [of family math] as impact."

Partners also found participation in the project meaningful and rewarding to them professionally and personally. Of note, the parent members felt very supported in their new role, and felt "equal" to the other team members. They liked advocating for parents, by sharing their perspectives on the program and materials. They also learned a lot at the monthly meetings that they were able to put into practice with their own young children. In this way, they felt they were helping their kids get ahead.

Partners were optimistic about the lasting effects of the YM-W grant, while acknowledging that "it will take some work on our part to not lose that focus and initiative." As one partner said, "You can never be satisfied in the moment; you always have to be thinking ahead. The effectiveness of PD is great but it wanes." Partners were actively thinking about ways to stay connected to EDC and continue some sort of family math PD, especially for new hires.

As the first two years of the project drew to a close, sustainability was also top of mind for the EDC team. Priorities included identifying/building capacity for both organizational and community leadership after the grant, updating the website for use by educators and families, creating videos with educators' voices, and investigating materials distribution mechanisms. The team also anticipated working on blog posts and journal articles as part of the dissemination phase of the project.

Professional Learning Sessions and Resources

EDC project leads offered professional learning sessions and resources to help educators engage families and support quality early mathematics teaching and learning across school and home. The professional learning sessions included content on children's early mathematics learning trajectory within module strands, mathematics games and activities aligned to that strand, modifications for different-age children, and the importance of positive attitudes toward mathematics. The sessions also featured small groups / breakout rooms for more targeted discussion of programming and implementation strategies. Participating educators received MAEYC CEUs.

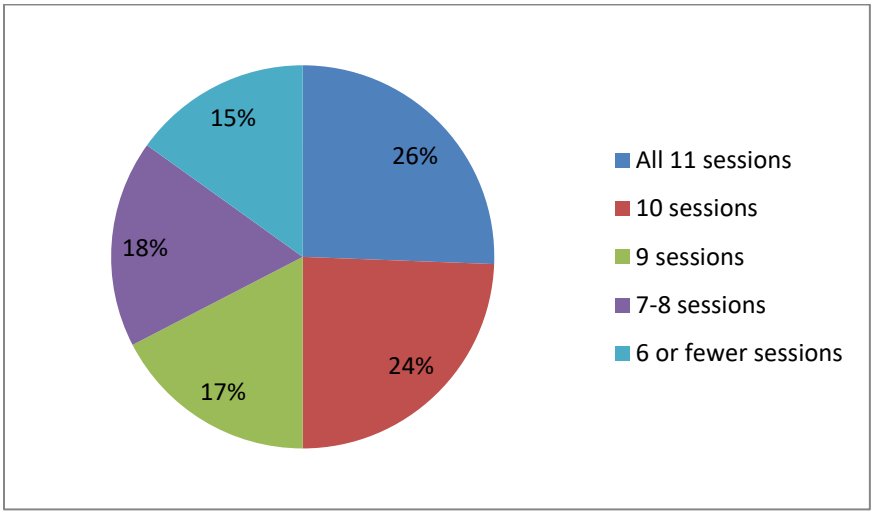
The Year 1 (2019-2020) module, Numbers and Operations, was offered in a staggered cohort model. Cohorts 1 (September-November 2019) and 2 (November 2019-January 2020) each had six two-hour in-person sessions. Cohorts 3 and 4 had two in-person meetings before school closure due to the COVID-19 pandemic, after which they met for one hour weekly online from February through May 2020. This compressed schedule was based on feedback from participating educators and partners. Professional learning sessions for the Year 2 (2020-2021) module – Geometry, Patterns, and Spatial Relationships – started online in October 2020. Morning and afternoon sessions were offered and each met for one hour every two weeks through April 2021.

Head Start instructional coaches participated in the professional learning sessions. However, Head Start did not offer coaching as planned during the 2020-2021 school year due to the pandemic, so YM-W's third planned module, Coaching for Mathematics, was not developed and implemented. This is being discussed during the Year 3 sustainability grant.

Attendance

As illustrated in Exhibit 3, about two-thirds (67%) of the educators participating in Year 2 attended nine, 10, or all 11 of the professional learning sessions.

Exhibit 3
Year 2 Attendance



N = 86 (includes only educators who were still employed by the organization at the end of Year 2).

Educator Feedback

Educators found all the program components quite beneficial, as displayed in Exhibit 4. They found the videos particularly valuable to their professional development in family math and early math learning. In both Years 1 and 2, Head Start Assistant Teachers found the homework assignments (Year 1) / reflection questions (Year 2) more valuable than did the Lead Teachers. See Exhibit 5. Also, in Year 2, those with Master's degrees were more positive about the articles, the videos, and the reflection questions. In Year 1, Head Start educators several program components more valuable than did the Worcester Family Partnership educators; however, this difference did not persist in Year 2.

Exhibit 4
Educator Ratings of Value of YM-W Program Components

	Year 1 (N = 29-35; Cohorts 3-4 only)		Year 2 (N = 57-60)	
	Top-box ratings	Mean rating	Top-box ratings	Mean rating
Videos of math games and math activities in classrooms and at home	80%	4.49	90%	4.53
Articles related to math topics	75%	4.23	82%	4.30
Weekly online meetings	66%	4.06	78%	4.17
YM Facebook group	63%	3.83	N/A	N/A
YM website course elements	N/A	N/A	75%	4.12
Ideas that were shared in the chats	61%	3.85	75%	4.05
Homework assignments	60%	3.66	N/A	N/A
Reflection questions	N/A	N/A	59%	3.75
Discussion forum posts	N/A	N/A	56%	3.58

"Top-box" is defined as the top two ratings on a 5-point scale. Scale: 1 = Not at all valuable, 2 = A little valuable, 3 = Valuable, 4 = Very valuable, 5 = Extremely valuable.

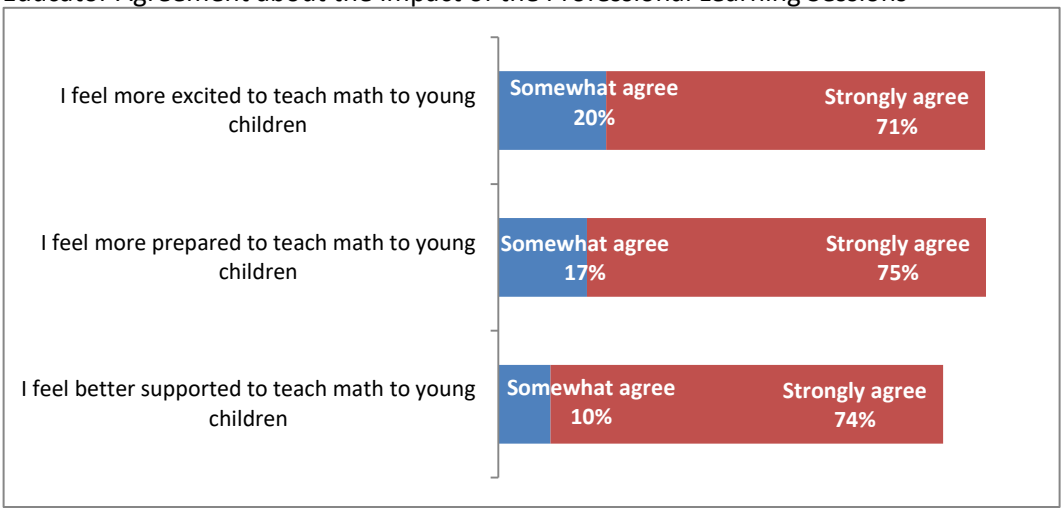
Exhibit 5
Head Start Lead vs. Assistant Teacher Ratings of Value of YM-W Program Components

	Year 1 (Homework assignments*) (N = 23; Cohorts 3-4 only)		Year 2 (Reflection questions†) (N = 37)	
	Top-box ratings	Mean rating	Top-box ratings	Mean rating
Assistant teachers	91%	4.36	69%	4.00
Lead teachers	50%	3.42	38%	3.38

* $p < .05$, † $p=.063$. "Top-box" is defined as the top two ratings on a 5-point scale. Scale: 1 = Not at all valuable, 2 = A little valuable, 3 = Valuable, 4 = Very valuable, 5 = Extremely valuable.

In addition, nearly all educators felt more excited, more prepared, and better supported to teach math to young children after participating in the professional learning sessions, as shown in Exhibit 6.

Exhibit 6
Educator Agreement about the Impact of the Professional Learning Sessions



N = 59-61. Scale: 1 = Strongly agree, 2 = Somewhat agree, 3 = Neither agree nor disagree, 4 = Somewhat disagree, or 5 = Strongly disagree.

Family Math Materials

In Year 1, the first two cohorts of educators received kits at the end of each session to provide to families, as planned. The kits included a guide with information about early mathematics development, Games Sheets (instructions on playing the games at different developmental levels), mathematics mini-books, and suggestions for related picture books available at the library. In addition, families received a set of dot cards to play dot card games, number cubes (dice) to play number cube games and to use with the board games, Lily Pad boards to play the Lily Pad game, and Shape Cards to play different types of card games, and a booklet with related game directions. Cohorts 3 and 4 educators received materials for themselves and for families in August, 2020.

In Year 2, the YM-W team added Family Math Kits to school supply kits being delivered to families by Head Start in the fall of 2020. YM-W delivered booklets in English and Spanish, and provided copies in Portuguese and Arabic for any families who wanted them.

Parent Feedback

In both years, most parent survey respondents used the YM-W materials with their children and found them beneficial. The Year 2 parent survey included pictures of the math games, books, and materials that programs provided to parents. Nearly all responding parents (91%) recalled receiving the materials. Of those, 82% had used them. See Exhibit 7. Most of those who used the materials used them at least weekly.

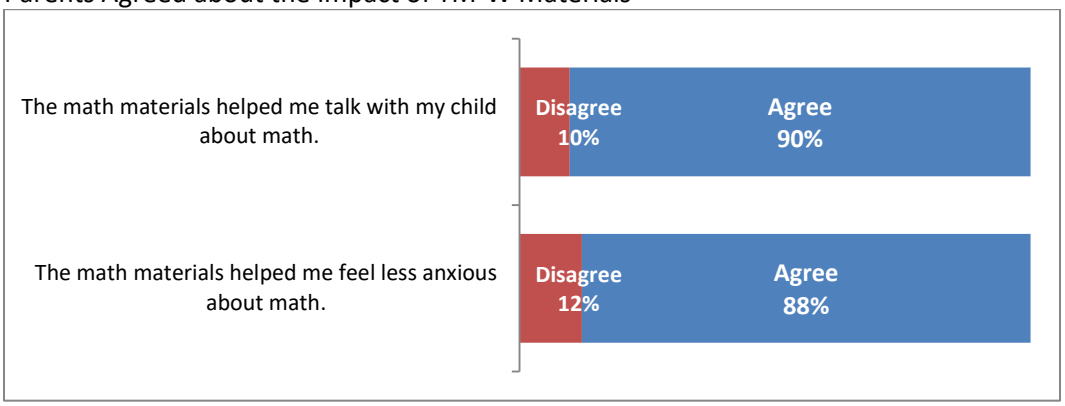
Exhibit 7
Frequency with which Responding Parents Used YM-W Materials

	Frequency of use	% of respondents
Used materials (82%)	Almost every day	8% (n = 4)
	2-4 times a week	32% (n = 16)
	Once a week	34% (n = 17)
	Less than once a week	8% (n = 4)
Had not (yet) used materials (18%)	Planned to use	12% (n = 6)
	Did not use	6% (n = 3)

N = 50 (who responded and recalled receiving the materials).

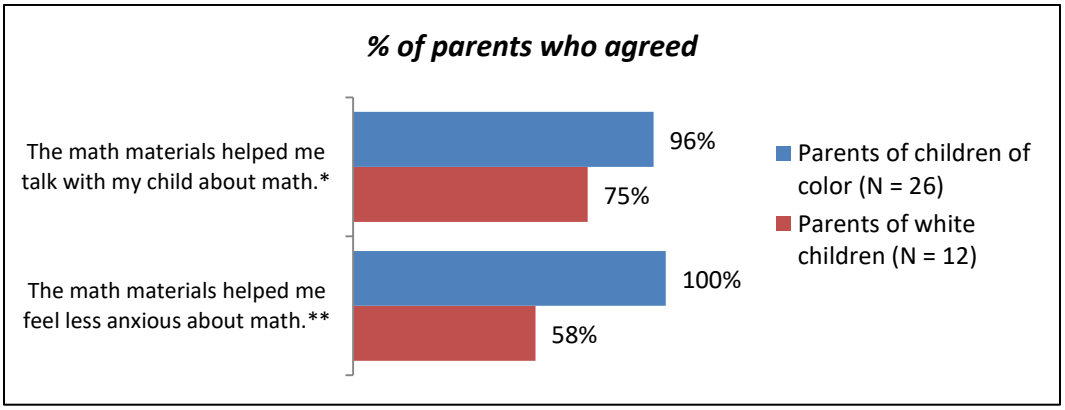
As shown in Exhibit 8, nearly all the parent survey respondents who used the materials agreed that they helped them talk with their children about math. They also agreed that the games and books helped them feel less anxious about math. Parents of children of color were more positive than parents of white children about the impact of the materials on their math conversations and anxiety; see Exhibit 9.

Exhibit 8
Parents Agreed about the Impact of YM-W Materials



N = 41. Scale: 1 = Strongly agree, 2 = Somewhat agree, 3 = Neither agree nor disagree, 4 = Somewhat disagree, or 5 = Strongly disagree.

Exhibit 9
Parents of Children of Color Were Most Positive about the Impact of YM-W Materials



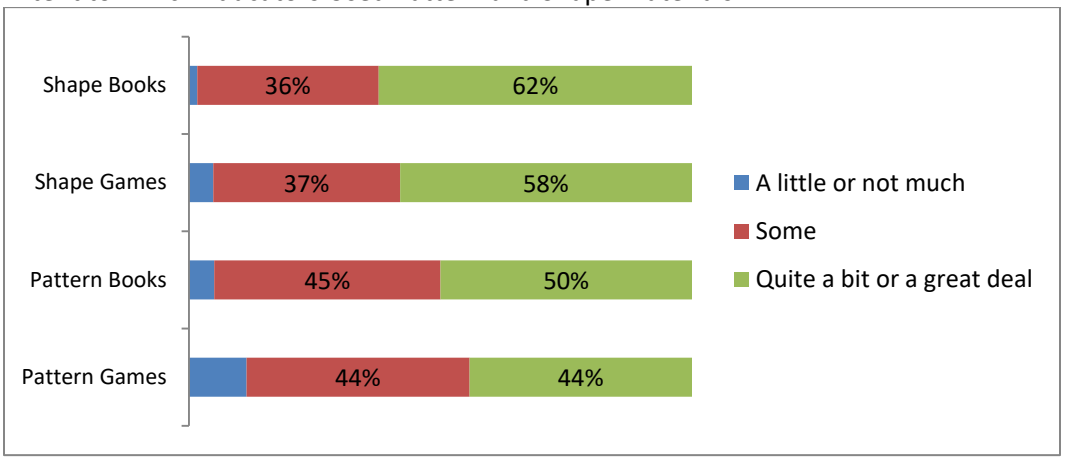
* p < .05, ** p < .01. Scale: 1 = Strongly agree, 2 = Somewhat agree, 3 = Neither agree nor disagree, 4 = Somewhat disagree, or 5 = Strongly disagree.

Educator Implementation

Among parents who responded to this series of questions and recalled receiving the materials, 62% reported that their child's teacher, playgroup facilitator, or home visitor had used the materials with them and their children during remote learning. Fourteen percent were not sure and 24% said their educator had not used the materials with them.

For their part, nearly all the educator survey respondents reported using the Year 2 materials in at least some of their meetings with children, and about half used them quite a bit or a great deal. See Exhibit 10. Based on their responses, educators used the shape books and games a bit more than the pattern books and games.

Exhibit 10
Extent to Which Educators Used Pattern and Shape Materials



N = 60-62. Scale: 1 = Not much at all, 2 = A little, 3 = Some, 4 = Quite a bit, or 5 = A great deal.

Family Math Leaders

In Year 1, a YM-W Family Advisory Council (FAC) was formed to advise the leadership team about how the project was or was not meeting the needs of the community and how it could be improved. In Year 2, the FAC was renamed the Family Math Leaders. The group discussed implementation of the YM-W project and family math materials, and received, tried out, and provided feedback on the materials. In both years, the group met monthly from November through May.

Family Math Leader Feedback

Annual focus groups with family math leaders indicated they valued being able to contribute to the Young Mathematicians project, and they felt the experience helped them see themselves as leaders. Initially, this involved trying out and providing feedback on the activities, and then sharing information and activities with other parents. Their roles evolved as the project planned for sustainability after the grant, and they appeared very invested in "passing it on," both to other families as well as throughout the community.

They also learned how to introduce their own young children to math, which involved building their own vocabulary and acquiring skills for engaging their children. They were motivated by the progress they saw their children making.

Family leaders appreciated the culture and environment of the group, where they drew inspiration and practical and creative suggestions from one another. They praised the style of the EDC team. They felt listened to and they felt the team was very accommodating in working with parents with young children.

One of the lessons learned from the Family Math Leaders was the desire / need for training on how to be community leaders, and on how to advertise the benefits of early math using social media. Another was the importance of an orientation if new parents are to join the group over time.

Family Math Website

As part of the grant, EDC launched a new and improved www.ym.edc.org website that includes family math resources for families, teachers, and other educators. The website features math game directions and videos of how to play over 50 math games in English, Spanish, and Portuguese. The website has dedicated webpages to explore different math topics, including Shapes and Geometry, Counting and Cardinality, Operations, Spatial Relations, Measurement, and more. The website uses Learn Dash, a learning management system, to support professional learning for educators. In addition, the team will use the website as a platform to disseminate information, articles, and webinars.

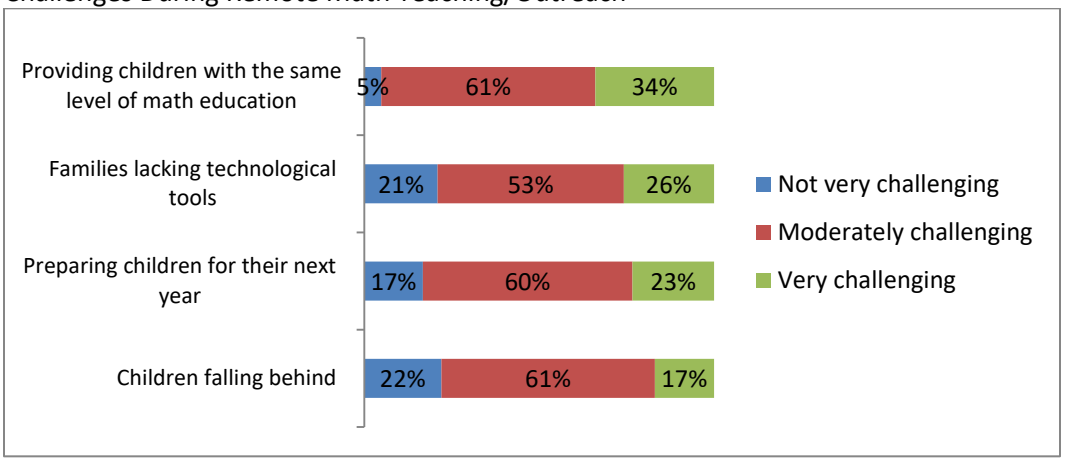
Dissemination

As planned, the team used tailored materials and multi-level approaches to disseminate their work. They presented (or will be presenting) at conferences, including but not limited to the National Council of Supervisors of Mathematics, The National Council of Teachers of Mathematics, and the National Association for Family, School, and Community Engagement, and the National Center for Families Learning. They have had blogs and journal articles in Edutopia and Teaching Young Children. They have also shared lessons learned through the Family Math Network. The new website will be a vehicle for dissemination, as will other social media. For more details see EDC's final report.

Educator and Parent Challenges with Remote Teaching and Learning

Most educators encountered at least moderate challenges in a number of areas during their remote math teaching and outreach. Based on data collected at the end of Year 2, shown in Exhibit 11, about one-third of educators found it highly challenging to provide children with the same level of math education / facilitation as they would get attending in person, and about one-quarter faced significant challenges with some families lacking the technological tools to engage in remote math learning.

Exhibit 11
Challenges During Remote Math Teaching/Outreach



N = 60-62. Scale: 1 = Not at all challenging, 2 = Low level challenge, 3 = Slightly challenging, 4 = Moderately challenging, 5 = Very challenging, or 6 = Extremely challenging.

Parents' challenges had to do with being in the role of "co-learner," distractions during remote teaching, and concerns about their children's social skills. In terms of being in the role of co-learner, some parents seemed to feel pressured to be their child's teacher and worried about their ability to fulfill that role, and make learning fun for their child. For some, their own relationship with math learning caused them concern.

> *I was worried about my ability to be able to teach him what he needs to know in time for school.*
>
> *Feeling that not having enough energy and resources to work with the child*
>
> *The challenge is to learn together with my son and … make it fun*
>
> *I would love for my child to be able to learn differently than I did growing up. When I was in school, math was my worse subject. So I would like to change that for my daughter's future.*
>
> *I am horrible at math so I wasn't able to help.*

Parents also worried about distractions to their children's remote learning and found it challenging to entice their children to sit in front of the tablet for sessions.

> *With remote learning kids tend to get distracted more easily and they don't learn as much; they would learn more face to face in a class room with a teacher where there are no distractions.*
>
> *Hard to keep the kids focused at home.*

The only challenge was getting my son to sit in front of a tablet when class started and he was playing or eating a snack. It is hard to make your child sit for a class remotely.

A couple of parents expressed concern that their children were missing out on interactions with teachers and other students.

Social skills with other kids is the top concern.

Missed interaction with teachers and other students. Need that one on one.

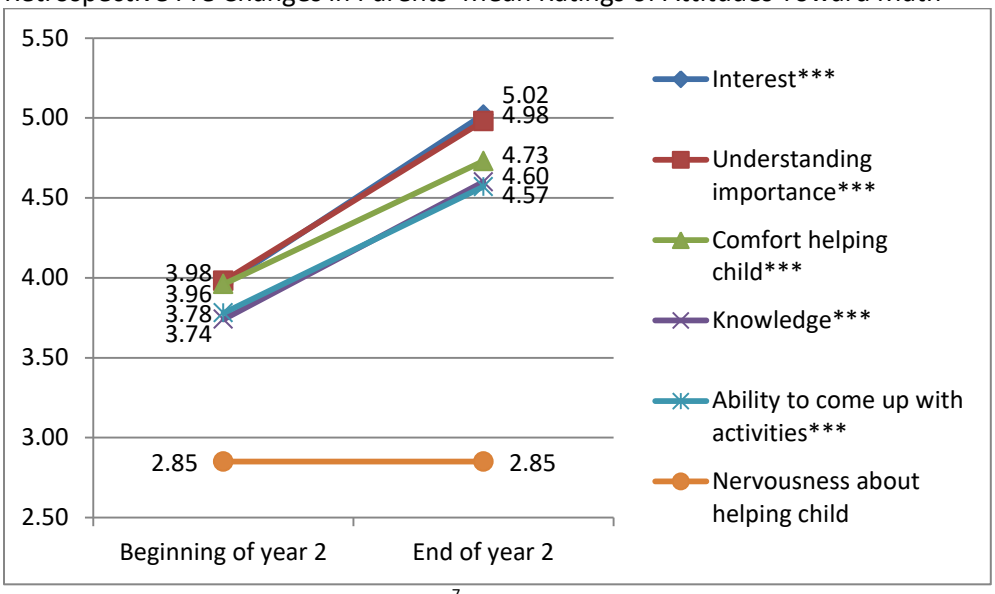
To what extent did the partnership promote an increased understanding of the importance of math for families and an increase in family reports of positive attitudes toward math?

The program sought to help develop families' knowledge of young children's mathematical thinking, based on literature demonstrating that families who have a better understanding of early mathematical development may implement more mathematics activities at home (DeFlorio & Beliakoff, 2015). The intervention also considered parents' attitudes toward mathematics, as research reveals that adults' math anxiety can dampen children's mathematics outcomes (Young, Kook, & Reed, 2018).

Both Year 1 and Year 2 parent surveys included a retrospective pre measure of parents' understanding of the importance of early math learning as well as other attitudes toward math, including interest in and knowledge of early math, and comfort (or nervousness) with and ability to engage in math with their children. For the retrospective pre measure, parents rated their math attitudes at the end of the school year and also reflected back to the beginning of the school year and rated their math attitudes then. Parents rated the items using a 6-point Likert scale, ranging from 1 (very low) to 6 (very high).

In both years, there were statistically significant changes in parents' mean attitudes. Year 2 results are shown in Exhibit 12. Parents showed increased understanding of the importance of early math learning, and increased interest in and knowledge of early math. They indicated increased comfort helping their children with math and an improved ability to come up with fun math activities to do with their children. On average, parents started the year in a slightly positive position regarding these attitudes and improved to a moderately positive stance.

Exhibit 12
Retrospective Pre Changes in Parents' Mean Ratings of Attitudes Toward Math



N = 48-50 except for Nervousness N = 41.[7] *** p < .001. Scale: 1 = Very low, 2 = Moderately low, 3 = Slightly low, 4 = Slightly high, 5 = Moderately high, or 6 = Very high.

The one area where parents' attitudes remained stable was in nervousness about helping their children with math; on average, they had *slightly low* anxiety both at the beginning and the end of the year. The intransigence of parents' nervousness is not surprising given reports on the impacts of the pandemic on parents of young children. For example, NIEER's December 2020 Preschool Learning Activities Survey documented a range of hardships parents were experiencing due to the pandemic, with the most common being getting less work done due to child care and education issues. It also revealed that most parents whose children received remote/hybrid preschool programs felt overwhelmed by the responsibility of facilitating at-home learning for the child.[8] This makes the finding discussed earlier that parents who used the YM-W materials agreed that the materials helped them feel less anxious about math – all the more meaningful.

[7] The Nervousness item was the last item on this survey question and the only negatively worded item. By comparing responses on this item to responses on another related survey item, we determined that this led 7 respondents to a predictable response style (or acquiescence bias) where they responded to this negatively worded item as if it were positively worded. Therefore, they were removed from analysis of this item.

[8] Barnett, W.S., & Jung, K. (2021). Seven Impacts of the Pandemic on Young Children and their Parents: Initial Findings from NIEER's December 2020 Preschool Learning Activities Survey. New Brunswick, NJ: National Institute for Early Education Research.

To what extent did the partnership/program promote an increased understanding of the importance of early math and an increase in educator report of confidence and positive attitudes toward math? To what extent did the program increase the quality of educator's math instruction and family math engagement practices?

Attitudes toward Math

A retrospective pre measure on the year-end educator surveys assessed changes in educators' understanding of the importance of early math as well as other attitudes toward math. Educators rated the items using a 6-point Likert scale, ranging from 1 (very low) to 6 (very high). In both years, there were statistically significant changes in educators' attitudes, as shown in Exhibit 13. Educators showed increased understanding of the importance of early math, and increased interest in early math. They indicated increased comfort engaging in math with young children and supporting family math. On average, educators started the program in a slightly positive position regarding these attitudes and improved to a moderately positive stance. The area in which educators improved the most, and were also the most positive at the end of Year 2, was in understanding the importance of early math.

Exhibit 13
Retrospective Pre Changes in Educators' Mean Ratings of Attitudes Toward Math

	Year 1 (N = 59)		Year 2 (N = 57)	
	Before YM	End of Year 1	Before YM	End of Year 2
Understanding importance of family math and early math learning***	4.05	5.51	3.96	5.60
Interest in early math activities and early math learning***	3.98	5.29	4.07	5.42
Comfort engaging in math with young children***	4.10	5.32	4.12	5.33
Comfort supporting families in early math***	3.47	4.88	3.30	4.77
Avoidance of math activities*** (Year 2; Not Significant in Year 1)	2.31	1.91	2.28	1.58

*** $p < .001$. Scale: 1 = Very low, 2 = Moderately low, 3 = Slightly low, 4 = Slightly high, 5 = Moderately high, or 6 = Very high.

In addition to the retrospective pre measure, educator surveys included pre-post measures of teachers' beliefs about early math. In Year 1, using the Teachers' Beliefs about Preschoolers and Math scale (an 8-item scale of Chen and McCray's 2013 Early Math Beliefs and Confidence Survey), paired-samples t-tests showed a statistically significant increase in educators' agreement that children have the cognitive ability to learn math and a statistically significant decrease in teachers' agreement that children should be helped to learn math using a published math curriculum.

On the Year 2 measure, paired-samples t-tests showed statistically significant changes indicating that educators grew in their beliefs that everyone can learn math and that young children are curious about math ideas, ideas, and became less fearful or more confident about their ability to teach math to young children. See Exhibit 14.

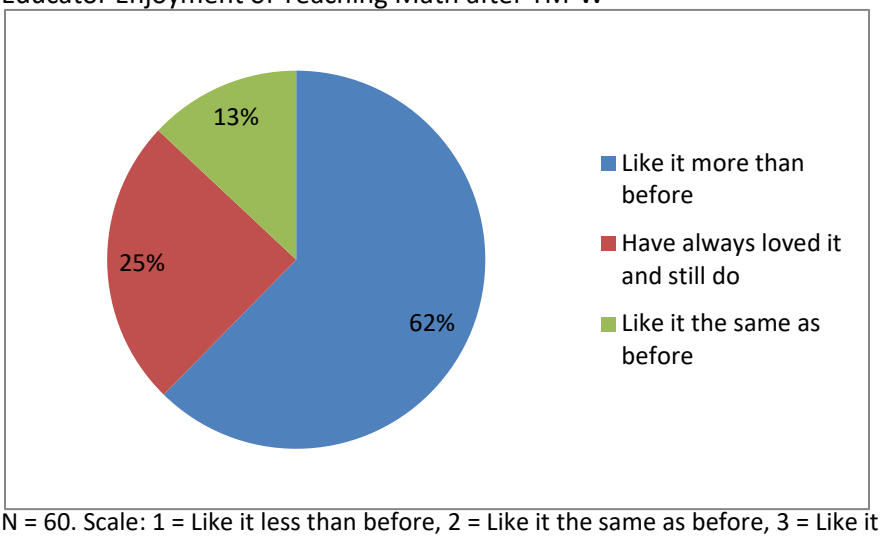
Exhibit 14
Educators' Agreement with Statements about Teaching Math

	Start Yr 2	End Yr 2
I don't feel that young children are curious about math ideas. (REVERSED) *	92%	100%
I do not believe it is appropriate to introduce math to children at an early age. (REVERSED)	96%	94%
I am comfortable using any classroom or playgroup materials (e.g. blocks or boxes) for math activities.	92%	92%
I feel comfortable with the level of math knowledge I need to teach young children.	79%	89%
I feel comfortable doing math activities in my preschool classroom or in my playgroup.	87%	89%
I fear that I won't teach math to young children very well. (REVERSED) **	62%	81%
I enjoy looking for ideas online or in books for math activities to do with young children.	70%	81%
I am familiar with the processes and ways that young children learn math.	68%	79%
I am afraid the children may ask me a question about math that I cannot answer. (REVERSED)	77%	72%
Math concepts seem to be easier for boys to learn than for girls to learn. (REVERSED)	64%	68%
Not everyone can learn math concepts easily. (REVERSED) ***	25%	58%

N = 53. * $p < .05$; ** $p < .01$; *** $p < .001$. Scale: 1 = Strongly agree, 2 = Agree, 3 = Somewhat agree, 4 = Neither agree nor disagree, 5 = Somewhat disagree, 6 = Disagree, or 7 = Strongly disagree.

As displayed in Exhibit 15, another indicator of increased positive attitudes toward math was that nearly two-thirds (62%) of educators overall liked teaching math to young children more after participating in the YM program than they did before participating; 38% reported no change.

Exhibit 15
Educator Enjoyment of Teaching Math after YM-W

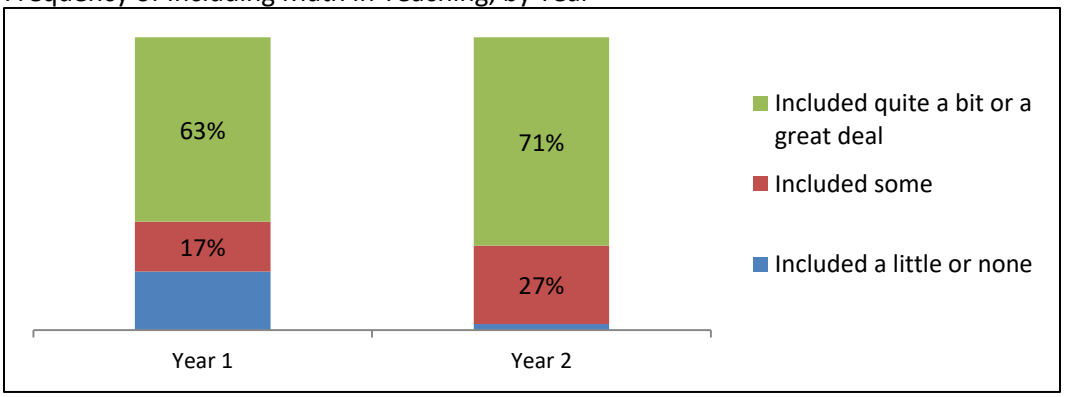


N = 60. Scale: 1 = Like it less than before, 2 = Like it the same as before, 3 = Like it more than before, or 4 = Have always loved it and still do.

Math Instruction

Two-thirds of educators reported being able to include math in *quite a bit* (47%) or *a great deal* (19%) of their teaching and outreach with families during continued school closure in 2020-2021, and about one-third (31%) included math in *some* of their teaching and outreach. Parent reports of the extent to which their child's teacher, playgroup facilitator, or home visitor focused on math during remote learning were roughly comparable (although with higher percentages at the extremes): 63% said *quite a bit* (21%%) or *a lot* (42%); 21% said *some*; 15% said *a little*; and 2% said *not at all*. Among a subset of educators for whom we were able to match Year 1 and Year 2 data, we observed a trend for the frequency of including math to increase from the first to the second year of the program, as presented in Exhibit 16.

Exhibit 16
Frequency of Including Math in Teaching, by Year



N = 41. Scale: 1 = Not able to include math in teaching/outreach, 2 = Included math in a little bit of teaching/outreach, 3 = Included math in some teaching/outreach, 4 = Included math in quite a bit of teaching/outreach, or 5 = Included math in a great deal of teaching/outreach.

Educators introduced YM-W activities and books into their lesson plans for virtual meetings and playgroups. They also posted them on SeeSaw and directed families to resources on the website.

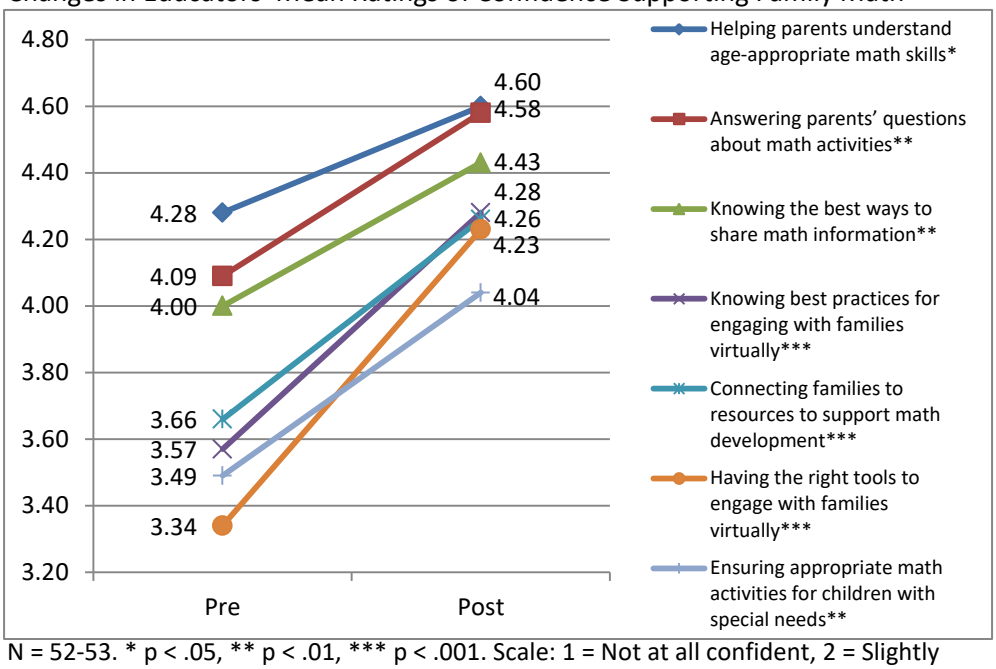
> *Every meeting always includes counting of some time. We would encourage the children to tell us how many people were here, which often turned into an addition lesson, for example if they forgot to include themselves when counting. We would also compare girls/boys/teachers.*
>
> *Families asked about what they could be doing with their children for math and we were able to provide the online resources for them through your site, we talked about the games that were sent home, and posted activities on Seesaw for families to participate. This was during class times, especially one on one meets with children and any meets we did with the parents.*
>
> *I definitely incorporate more math into my playgroups and my understanding of what constitutes "math learning'' has expanded.*
>
> *I included elements of the math materials and activities into most of my meeting. We included each of the books that were given this year in our virtual meetings. We also played measurement investigations, pattern activities and counting/ quantity investigations.*
>
> *There were a number of activities we did with the families during our virtual meetings. We would let them know ahead of time which materials to bring, such as 4 different pairs of socks, to sort. We would also include an explanation of how and what the children would be learning and how it relates to other things.*

Family Math Engagement Practices

In Year 2, we were more intentional about exploring educators' confidence supporting families to engage their children in math at home. There were statistically significant changes in educators' confidence in seven of nine items, shown in Exhibit 17.

Educators showed increased confidence helping parents understand children's age-appropriate math skills and answering their questions about early math activities. They were also more confident about the best ways to share math information with parents and connect families to resources that can support children's math development. In terms of engaging with families in the virtual environment, educators were more confident about knowing the best practices and having the right tools. Lastly, they felt more confident knowing how to ensure that math activities were appropriate for families with children with special needs. On average, educators started the year feeling slightly to moderately confident in supporting families in these ways and improved to feeling moderately to very confident.

Exhibit 17
Changes in Educators' Mean Ratings of Confidence Supporting Family Math



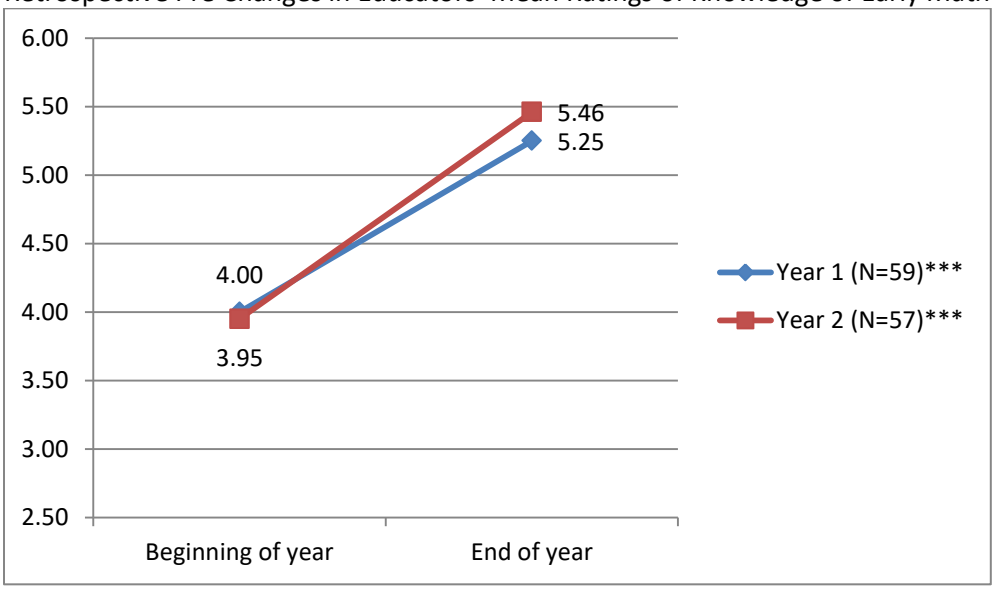
N = 52-53. * p < .05, ** p < .01, *** p < .001. Scale: 1 = Not at all confident, 2 = Slightly confident, 3 = Moderately confident, 4 = Very confident, or 5 = Extremely confident.

To what extent does the project increase educators' knowledge of math and math learning and reduce educator's math anxiety?

Educators' Knowledge of Math and Math Learning

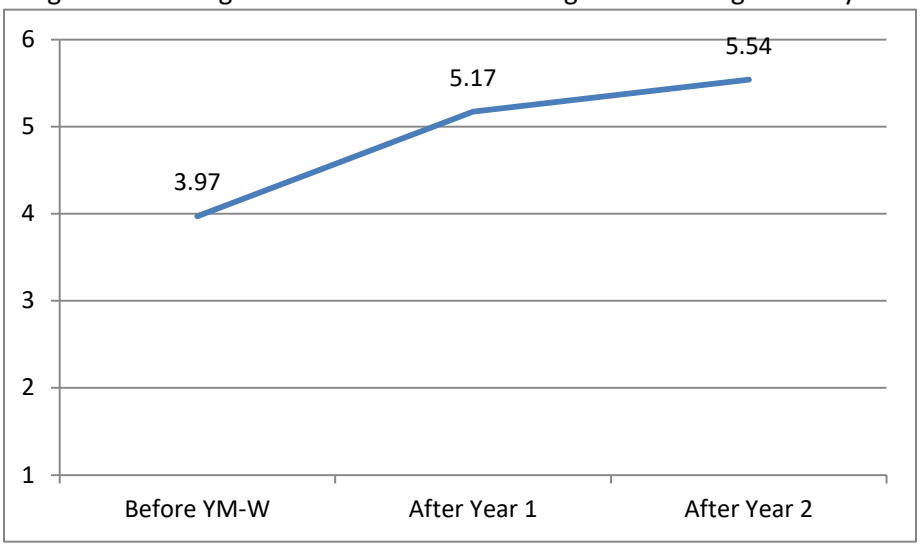
Similar to the parent surveys described above, year-end educator surveys also included a retrospective pre measure of their attitudes toward math, including their knowledge of early math. The measure revealed statistically significant increases in educators' knowledge in both years, as seen in Exhibit 18. Further, among educators who completed surveys in both years, there was a statistically significant increase in their knowledge from the end of Year 1 to the end of Year 2. See Exhibit 19.

Exhibit 18
Retrospective Pre Changes in Educators' Mean Ratings of Knowledge of Early Math



*** p < .001. Scale: 1 = Very low, 2 = Moderately low, 3 = Slightly low, 4 = Slightly high, 5 = Moderately high, or 6 = Very high.

Exhibit 19
Longitudinal Changes in Educators' Mean Ratings of Knowledge of Early Math



N = 35. *** p < .001. Scale: 1 = Very low, 2 = Moderately low, 3 = Slightly low, 4 = Slightly high, 5 = Moderately high, or 6 = Very high.

In addition, in YM-W's first year, paired-samples t-test revealed statistically significant increases in educators' Knowledge of Mathematical Development (KMD), a set of 20 multiple-choice questions that tested early childhood teachers' knowledge of children's development in the area of verbal counting sequences, ordinals, addition/subtraction, divisions of sets, written symbols, and number words (Platas, 2008).[9] KMD scores increased from an average score of 1.67 or 25% correct to 1.93 or 48% correct ($p < .05$).

In Year 2, to investigate educators' understanding of children's development of pattern and shape concepts, the program team developed a questionnaire similar to Platas' (2008). The goal of this administration was to gather insight into educators' understanding of children's mathematical development in other content areas not typically assessed. Unlike the previous analysis however, educators were not able to be followed pre- to post-intervention (educators completed the measure anonymously, precluding paired tests) and no average differences across administrations were found.

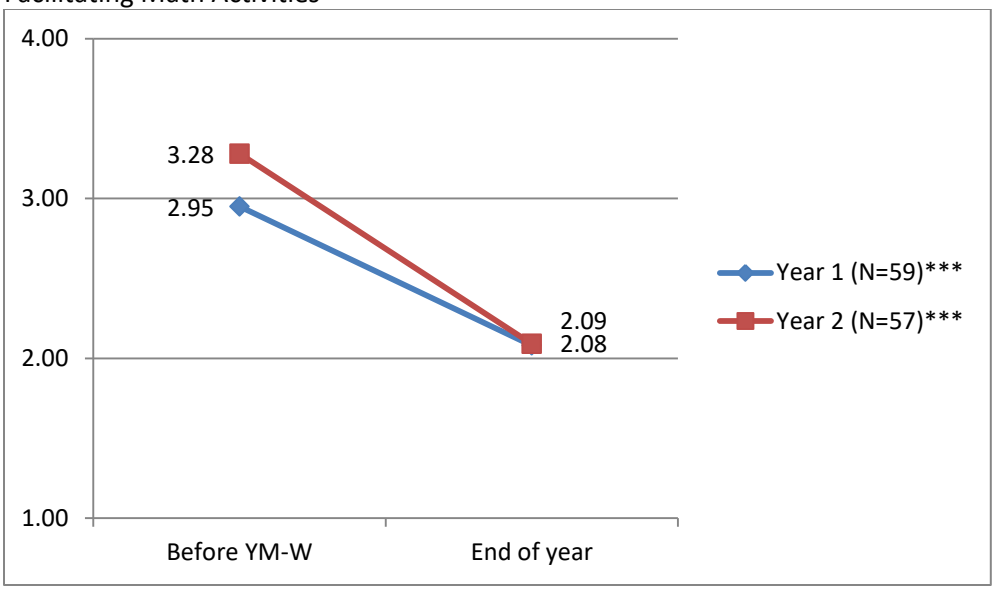
Educators' Math Anxiety

As noted earlier, this study began in the fall of 2019 and continued without stopping despite the COVID-19 public health crisis and program closures. The early childhood programs in this study were not able to meet in-person for a full year (March 2020-April 2021) and only offered remote learning options. At the beginning of the pandemic, educators were concerned about how to work virtually with families and preschoolers who depend on their programs. In response to educators, the EDC team quickly adjusted the in-person professional learning sessions to virtual without missing any sessions. To continue to support educators, the team shared various virtual mathematics instructional strategies and practices which educators could implement to keep children and families learning and practicing math at home.

While there were no statistically significant changes among educators in the anxiety measures we used, as presented in Exhibit 20, the retrospective pre measure revealed decreased nervousness about facilitating math activities in both years. On average, educators started the year with *slightly low* nervousness and decreased to *moderately low* nervousness by the end of the year. In addition, as described earlier, one of the items on the Year 2 pre-post measure of teachers' beliefs about early math showed that educators became significantly less anxious about teaching math to young children.

[9] For each question, educators selected the math skill that a child is likely to learn first from a pair of choices, or selected "Same" or "Do not know." All 20 items were included on the Year 1 baseline survey and four of the 20 items were repeated on the Year 1 post-training survey.

Exhibit 20
Retrospective Pre Changes in Educators' Mean Ratings of Nervousness about Facilitating Math Activities



*** p < .001. Scale: 1 = Very low, 2 = Moderately low, 3 = Slightly low, 4 = Slightly high, 5 = Moderately high, or 6 = Very high.

To what extent did the partnership promote children's math learning?

Unfortunately, the evaluation was limited in its ability to assess the impact of the initiative on children's math learning. A planned secondary analysis of the partner programs' child assessment data was not able to be conducted because, due to the pandemic, programs canceled one full assessment cycle and had inconsistent participation in subsequent virtual assessments. However, educators reported that the program mitigated the risks to children's learning posed by the pandemic and helped to strengthen family math engagement and learning. Moving forward, EDC and GRG will explore potential additional research partnerships to better understand the impact of the program on children's math learning.

The consensus from educators we heard from was that the abrupt switch to remote learning with the emergence of the COVID-19 pandemic was inherently challenging, but the YM-W program mitigated some of these challenges. At a time when teachers depended on family engagement and support to ensure learning was taking place at home, the YM-W program provided parents and guardians with helpful resources, with strong results.

Educators were appreciative of the role that YM-W played in boosting family engagement at such a crucial time. Many educators felt that parents engaging with the materials and activities alongside their child helped them become part of their child's learning experience. Educators observed parents enjoying this process, which allowed them to better understand their child's knowledge and abilities.

One of the special parts about this was that not only were we able to engage with the children like we usually do, but we were able to have the parents assist the children and be a part of the learning experience. When we are in the classroom, we don't have the parents in the classroom right next to their child. This really gave the parent to opportunity to look through their child's materials and actually read what their child is learning in order to help the teacher and the child with the activity.

I learned that the families enjoyed being a part of the math activities. It gave them a special time to be with their children. They also were happy to see how much their child knew. The activities were easy to follow. They appreciated being supplied the materials with the instructions.

It was much easier to help the families and children understand how Math can be incorporated into their daily lives when they were learning from home. We were in their environment teaching them that they can use it as a tool for Math. It seemed more effective than teaching them they can use Math all around them while we were in a classroom set up for Math learning. It was more practical for families to understand.

There were also challenges to children's remote math learning, as illustrated in the comments below.

A challenge was getting the children to have the materials with them for a lesson.

No matter how many ways we tried to encourage and engage our families, they did not bring the materials to the meetings that were given to them and they did not do the activities on their own that we sent them.

Many educators felt the boost in family engagement was accompanied by higher levels of observed student interest and engagement with math content. They saw children's improved understanding and skills. In some cases, children's math learning exceeded educators' expectations for the virtual environment.

Reading the book "It's a Sphere," kids were so involved in making bubbles, studying its shape and size. We extended the activity where kids used wooden blocks to measure their bubbles. The kids stayed for a 2 hour virtual class meeting and they were fully engaged and didn't want to end it.

Children grasp the math ideas better by completing hands-on activities or seeing a concrete example. I feel including the families by simply sending home the game instructions helps the children become more engaged in the activity. It's a special game they get to do as a family. This helps both social/emotionally as well as their math skills.

I learned that children in our classroom did better than I expected in learning basic math skills and were very engaged in the math activities online.

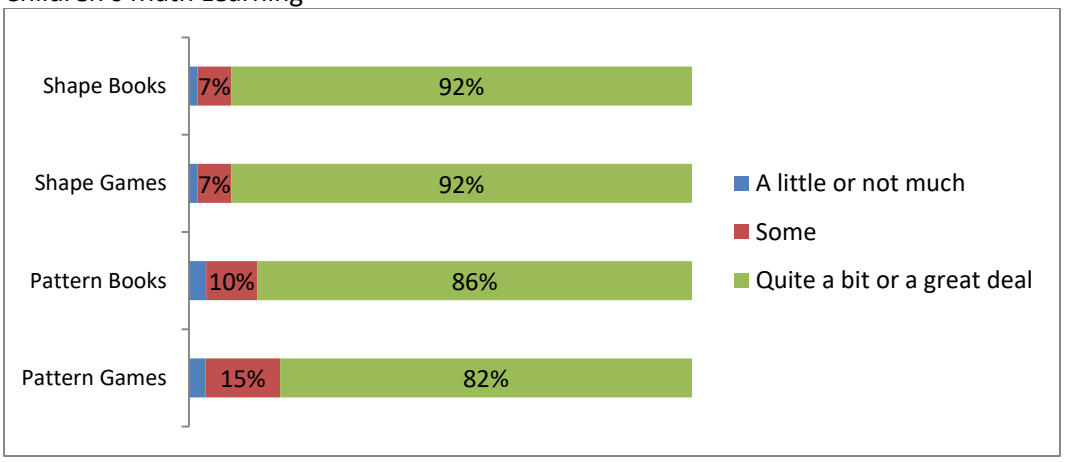
On the other hand, it was challenging for educators to accurately assess children's math learning. Educators could not always see children's work, their process of problem solving, and the extent to which they were relying on their parents.

… challenging to actually be able to see children's work or creations or problem solving that they had done.

… difficult at times to know what a child actually knows versus just repeating what they heard their parent say.

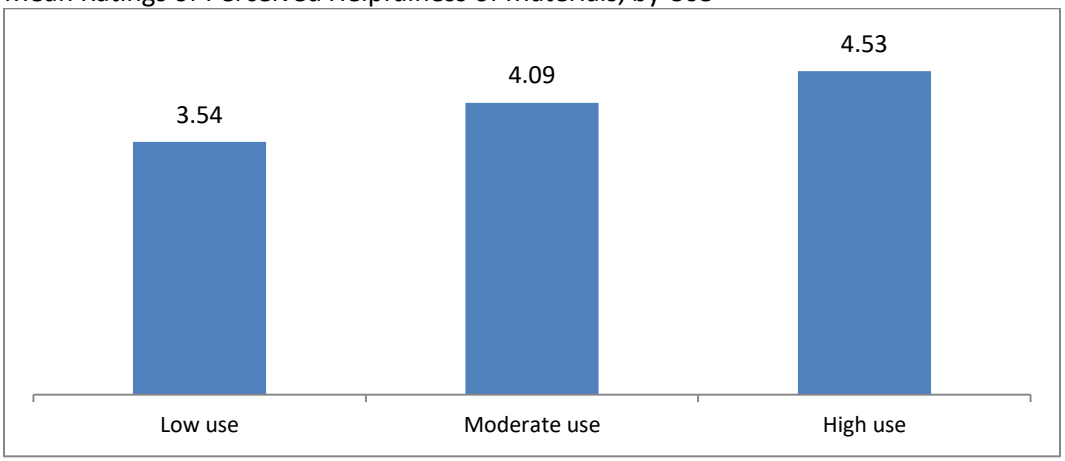
As far as the YM-W materials promoting children's math learning, educators were quite positive. See Exhibit 21. In addition, as seen in Exhibit 22, there was a positive relationship between their own use of the materials and their perceptions of impact; the more an educator used the materials, the more helpful she found them to children's math learning.

Exhibit 21
Extent to Which Educators Found Pattern and Shape Materials Helpful to Children's Math Learning



N = 59-61. Scale: 1 = Not at all helpful, 2= A little helpful, 3 = Somewhat helpful, 4 = Very helpful, 5 = Extremely helpful.

Exhibit 22
Mean Ratings of Perceived Helpfulness of Materials, by Use



N = 62. p < .01. Scale: 1 = Not at all helpful, 2= A little helpful, 3 = Somewhat helpful, 4 = Very helpful, 5 = Extremely helpful.

What was the net promoter score for the family math learning community stakeholders?

Altogether, educator and parent surveys included three adaptations of a popular customer loyalty metric called the "Net Promoter Score" or NPS.[10] The YM-W NPS metrics were derived from the following questions:

- Educators: On a scale from 0 to 10, how likely are you to recommend the Young Mathematicians in Worcester professional learning sessions to a colleague?
- Parents: On a scale from 0 to 10, how likely would you be to recommend these games and mini-books to other parents of young children?
- Parents: On a scale from 0 to 10, how likely would you be to recommend that other parents of young children talk with their children about math?

In keeping with NPS practice, responses were categorized as follows:

- Promoters (score 9-10) were considered loyal enthusiasts who loved the sessions / materials / practice and would recommend them to others;
- Passives (score 7-8) were considered satisfied but unenthusiastic; and
- Detractors (score 0-6) were felt to be not particularly thrilled with the sessions / materials / practice.

[10] Reichheld, F. F. (2003). One number you need to grow. Harvard Business Review.

Exhibits 23 to 25 shows the results of these categorizations. Across both years, more than three-quarters of educators were promoters, extremely likely to recommend the YM-W program to a colleague. By the end of the two-year program period, a vast majority of parent survey respondents were promoters of family math talk and more than half were promoters of the YM-W materials. Of note, in Year 2 (where there was enough data to examine group differences), parents whose children were entering preschool or kindergarten were more likely than others to recommend the YM-W games and mini-books, while parents with graduate degrees were less likely than others to recommend the YM-W materials.

Exhibit 23
Educators' NPS Categorizations – Professional Learning Sessions

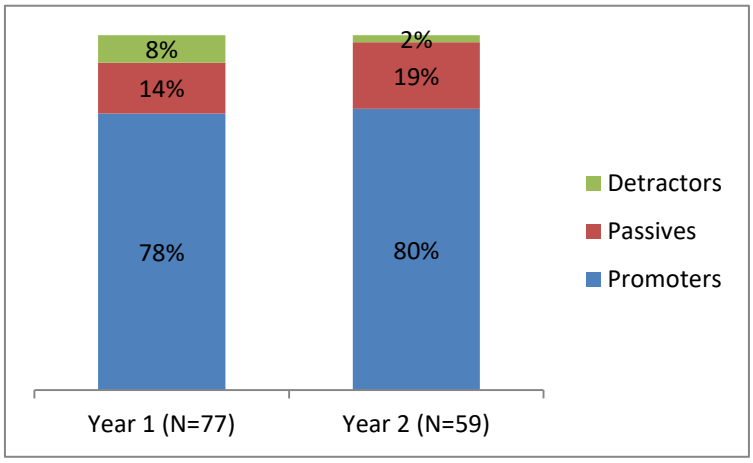


Exhibit 24
Parents' NPS Categorizations – Materials

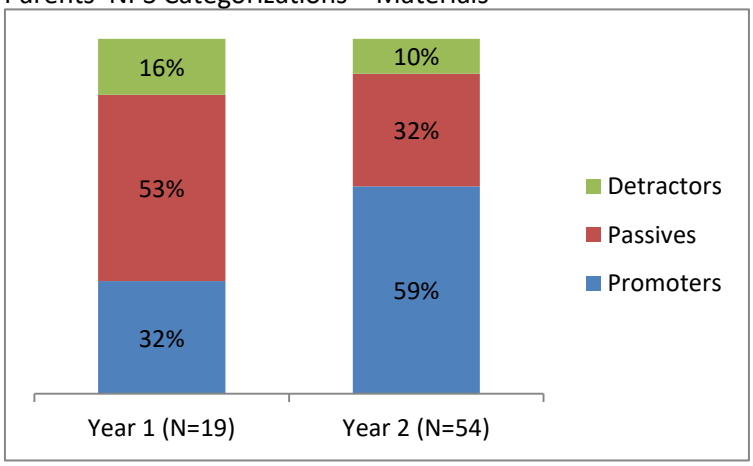
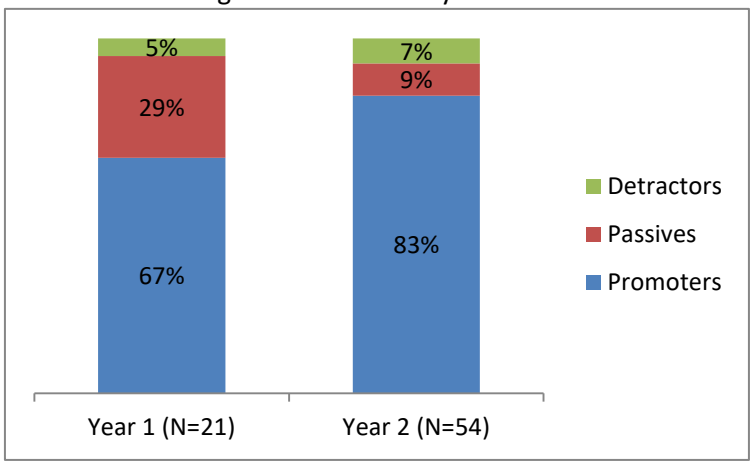
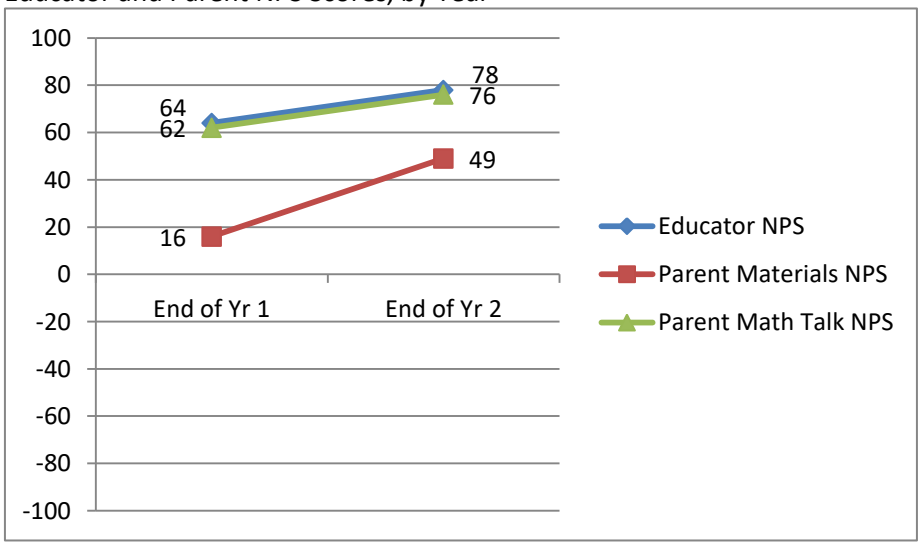


Exhibit 25
Parents' NPS Categorizations – Family Math Talk



The NPS score itself is calculated by subtracting the percentage of detractors from the percentage of promoters. Exhibit 26 shows the educator and parent NPS scores at the end of each program year. All of the NPS scores, across both years, can be considered "good," as they are above zero and imply there were more promoters than detractors. Still, each score improved from 2020 to 2021. The educator and parent math talk scores increased by 22% and 23%, respectively. The parent materials score showed a dramatic increase of more than 200%. According to some sources, the final parent materials score is reaching "excellence," and the educator and parent math talk scores can be considered "the best of the best."[11]

Exhibit 26
Educator and Parent NPS Scores, by Year



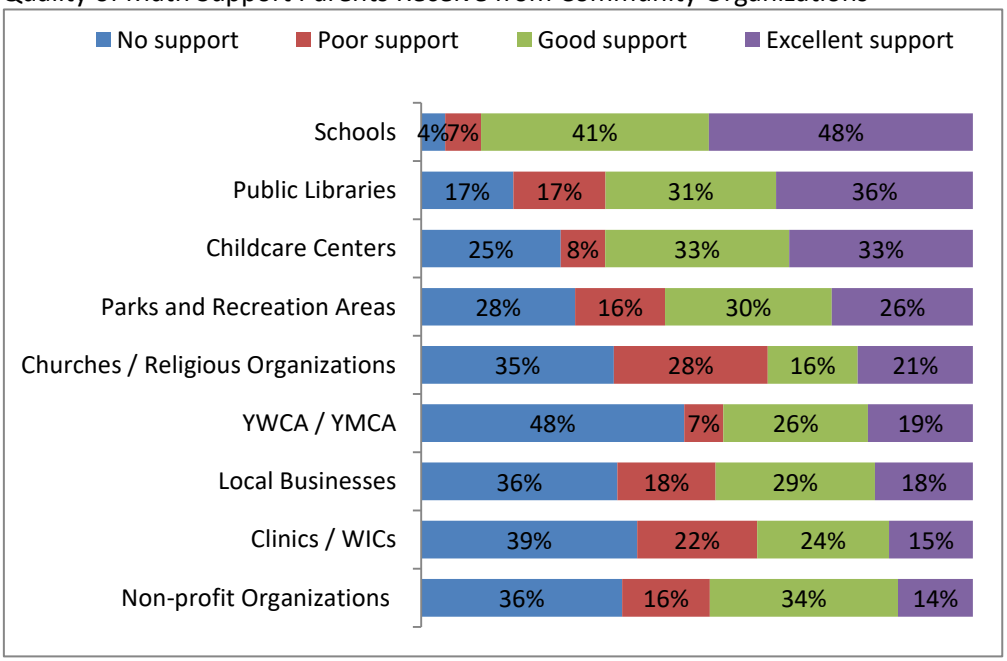
[11] https://blog.hubspot.com/service/what-is-a-good-net-promoter-score

To what extent did YM-W expand and connect children, families and educators to math learning and engagement opportunities?

While the YM-W team was able to engage in most of their major activities, they were not able to fully develop and implement some components as originally planned due to the COVID-19 pandemic. In particular, with the closing of many community organizations, they were not able to fully achieve their goal of expanding the family math learning community partnership across Worcester. Recognizing this, the Heising-Simons Foundation provided the team with a Year 3 sustainability planning grant to determine how to best move forward with current partners and to expand with new partners. The planning grant began in October, 2021 and finished in February, 2022. With Heising-Simons Foundation support, in March 2022, the team began a two-year grant focused on implementing the recommendations from the planning grant.

In anticipation of the work in 2022 and 2023, we collected data to inform next steps. We presented parent with a list of organizations in their community and asked them to rate the quality of math education support they get from each organization. The results are presented in Exhibit 27. Some community organizations, particularly schools and public libraries appeared to be doing a good job of supporting family math. Parents signaled that for other organizations –including the YWCA/YMCA, local businesses (e.g., grocery stores, laundromats, shopping malls), clinics/WICs, and non-profits (e.g., Boys and Girls Club) – there are opportunities to build this capacity.

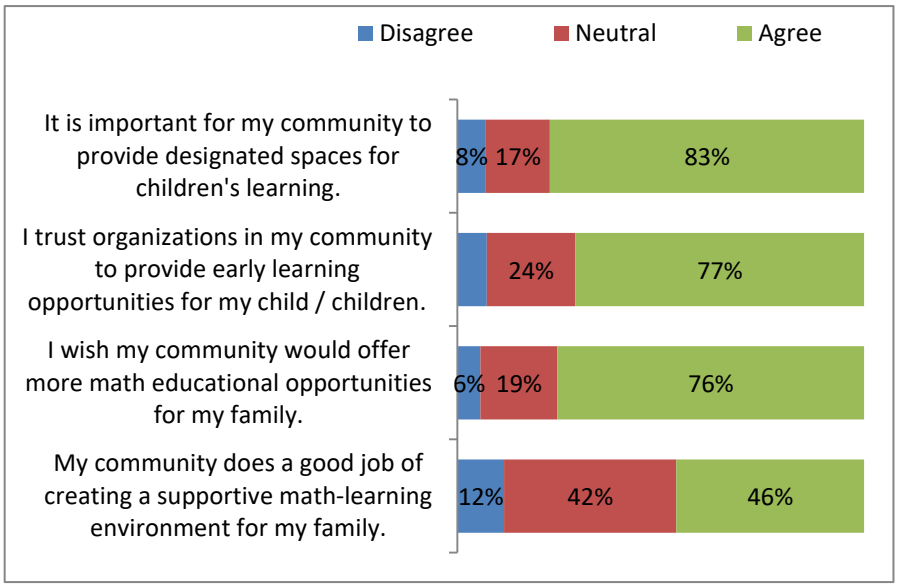
Exhibit 27
Quality of Math Support Parents Receive from Community Organizations



N = 42-48. Scale: 1 = This organization does not support my child's math learning, 2 = Poor support for my child's math learning, 3 = Good support for my child's math learning, or 4 = Excellent support for my child's math learning.

We further assessed parents' attitudes about their community's support for children's learning by asking them how strongly they agreed or disagreed with a series of four statements. As shown in Exhibit 28, a majority of parents agreed that community support for family math is important, and half wanted to see their community do a better job.

Exhibit 28
Parent Attitudes about Community Support for Children's Learning



N = 51-53. Scale: 1 = Strongly agree, 2 = Somewhat agree, 3 = Neither agree nor disagree, 4 = Somewhat disagree, or 5 = Strongly disagree.

CONCLUSIONS

The YM-W project made remarkable progress in carrying out its project development, implementation, and activities, as proposed, especially in light of the COVID-19 public health crisis. The partnership itself was meaningful and strong; the professional learning sessions and resources for educators were valuable; the family math materials were helpful; the family math leaders group was active and inspiring; the family math website was improved; and dissemination of the work is well underway.

The partnership promoted an increased understanding of the importance of math for families and families showed increased interest in and knowledge of early math, increased comfort helping their children with math, and an improved ability to come up with fun math activities to do with their children. Parents also reported the YM-W materials helped them feel less anxious about helping their children with math.

The partnership also promoted an increased understanding of the importance of math for educators and educators also showed increased interest in early math, and increased comfort engaging in math with young children and supporting family math. In some cases, educators' beliefs about early math also improved, for instance, growing in their understanding that everyone can learn math and that young children are curious about math ideas. There was also a trend for the frequency of educators including math in their teaching to increase from the first to the second year of the program.

Educators also grew in their confidence supporting families to engage their children in math at home. They showed increased confidence helping parents understand children's age-appropriate math skills and answering their questions about early math activities, were more confident about the best ways to share math information with parents and connect families to resources that can support children's math development, and were more confident about knowing the best practices and having the right tools for engaging families in the virtual environment. Educators also demonstrated increased knowledge of children's development of number concepts.

While we were limited in our study of the extent to which the partnership promoted children's math learning, educators clearly believed the program mitigated the risks to children's learning posed by the pandemic, and in some ways strengthened family math engagement and learning.

Finally, a majority of educators were extremely likely to recommend the YM-W program to a colleague, and a majority of parents were promoters of family math talk.

Next steps for the YM-W partnership include expanding the family math learning community partnership across Worcester. The evaluation helped demonstrate opportunities to build capacity for family math in the YWCA/YMCA, local businesses, clinics/WICs, and non-profits. It also demonstrated parents' beliefs that community support for family math is important and desired.

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