MotS librarians reported a clear increase in regularity with which they engaged a range of mathematics-related behaviors in their interaction with children and colleagues. …Almost all the librarians indicated that their thinking about the role of math in library activities for grades K–6 had changed through their participation in MotS. Librarians described a wide range of changes, including broader notions of mathematics and its connections to daily life, a heightened awareness of mathematical opportunities in their libraries, and increased efforts and intentionality in incorporating mathematics in their library programs and routines. MotS librarians were highly positive about the role of mathematics in the library, and reported a sharp increase with which they could explain to colleagues ways mathematics for K–6 supported their library’s mission.


This report covers the last four months of Year 2 and the first eight months of Year 3 of Math off the Shelf (MotS). The broad project goal is to build math capacity among public children’s librarians. These librarians, in turn, bring informal math to elementary grade children and their families directly at the library and indirectly, through outreach to other informal educators.

Years 1 and 2 major activities involved: building the project network of collaborators at the statewide or regional, city, and local levels; developing capacity within that network; creating, testing, and revising materials that public librarians use with children and families; and beginning to draft materials for librarians’ professional development. During this period, we worked primarily with Alpha Regions (CT, MA, Queens NY, and Westchester County NY) representing cities, suburbs, and rural areas. Librarians in these regions collaborated with us to shape and test materials for use with library patrons and for librarian-led outreach to other informal educators. In Year 2, we reached 128 librarians, who reported bringing MotS to 6,750 children and 250 parents.

Year 3 major activities to date have involved: helping selected Alpha Region librarians build capacity in MotS peer leadership and outreach; extending implementation and capacity-building to Beta Regions (see page 3); revising project materials based on Years 1 and 2 formative testing, evaluation data, and advisor input; and gathering data on initial project impact. In Year 3, we worked with 182 librarians and were able to get complete data on MotS use from 48% of them. These 87 librarians reported implementing MotS activities directly with 25,580 children and 4,651 parents. They estimate they have reached a further 45,595 children and 11,390 adults with MotS calendars, games, and other materials.
Although these data likely include repeat visitors, they reflect only a portion of the many librarians using our materials. Thus, we anticipate that actual figures are significantly higher.

We worked with selected librarians to hone their MoTS presentation skills; their workshops reached a total of 602 informal educators, including librarians, after-school providers, and paid homework helpers. Further project outreach efforts (mailings, conferences and workshops, website promotion) have reached thousands of informal educators.

This report covers a difficult period for public libraries. Increasingly, they must do more with fewer resources. National, statewide, and local budgets for library services are being slashed, while libraries are flooded with new patrons (ALA, 2009. State of America’s Libraries. Downloaded on April 9, 2010 from http://www.ala.org/ala/newspresscenter/mediapresscenter/presskits/2009stateofamericaslibraries/2009statehome.cfm). We have worked with advisors and collaborating libraries to ensure that MoTS meets the needs of today’s librarians despite these challenges. In this age of budget cuts, librarians are eager to show that the library’s mission of bringing learning to the public is fresh and vibrant: MoTS is well-aligned with this mission.

1. Major Activities

1A. Collaborations and partnerships

We carried out three key activities in this area:

(i) Providing professional development to a group of “Focal Librarians” so they could conduct workshops and outreach to other informal educators.

(ii) Collaborating with librarians in Beta (1) Regions to implement MoTS, in order to insure that project materials are appropriate to a wider range of audiences and to lay the groundwork for investigating impact in areas receiving less direct support from TERC.

(iii) Beginning to engage leaders in Beta (2) Regions, which will join the project in summer 2010.

Within each region, we work with librarians at several levels: state or regional levels, for broad promotion in mailings and resource sites and institutionalization in large-scale efforts such as summer reading themes; city or district-wide, for coordination of MoTS with local efforts in professional development, information sharing, and insuring continuity in the advent of branch closings; and local/branch, for supporting librarians in using MoTS materials and planning effective outreach plans both to peers and patrons. At each level, we develop approaches that leverage existing communication channels and strategies that librarians involved have found successful in the past.

Figure 1 reviews the support we give each type of region, with Alpha Regions joining first and receiving the most support, Beta (1) Regions receiving minimal project assistance, and Beta (2) Regions reflecting a more realistic scenario post-project. The Year 3 external evaluation report will consider these different levels of support on project impact.

We have lost 7 staff members to attrition or layoffs. We no longer have funds to hire subs, so there are times that the children’s room is not staffed at all for more than an hour at a time. (p. 38)

I think that the most important issue is “buy in” from staff and administration. Programs really can’t feel like “add-ons,” but must be organic. (p. 24)
FIGURE 1: ALPHA, BETA (1), AND BETA (2) REGIONS

<table>
<thead>
<tr>
<th>Region Type</th>
<th>Region</th>
<th>Beginning</th>
<th>Project support received from TERC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>CT</td>
<td>Year 1</td>
<td>Workshops or meetings 2–3 times per year; regular phone support and site visits; leadership training; color copies of print materials; stipend for time spent on MotS outreach beyond typical job responsibilities; monthly mailings</td>
</tr>
<tr>
<td>Alpha</td>
<td>Eastern MA (except Boston)</td>
<td>Year 1</td>
<td></td>
</tr>
<tr>
<td>Alpha</td>
<td>WLS (Westchester Library System)</td>
<td>Year 1</td>
<td></td>
</tr>
<tr>
<td>Alpha</td>
<td>Queens</td>
<td>Year 2</td>
<td></td>
</tr>
<tr>
<td>Beta (1)</td>
<td>St Louis</td>
<td>Early Year 3</td>
<td>Annual workshops; occasional site visits, e-mail and phone support; color copies of print materials; outreach stipend as above; monthly mailings</td>
</tr>
<tr>
<td>Beta (1)</td>
<td>San Jose</td>
<td>Early Year 3</td>
<td></td>
</tr>
<tr>
<td>Beta (2)</td>
<td>AZ: Willcox; Tuscon/Pima</td>
<td>Late Year 3</td>
<td>Occasional phone and e-mail support; limited color copies of print materials; outreach stipend as above; monthly mailings</td>
</tr>
<tr>
<td>Beta (2)</td>
<td>FL: Lake, Marion, and Broward Counties</td>
<td>Late Year 3</td>
<td></td>
</tr>
</tbody>
</table>

Within each type of region, librarians are involved with the project at different levels of intensity, as summarized in Figure 2. Year 2 external evaluation gathered data from Focal and Engaged Librarian.


### FIGURE 2: YEAR 3 LEVELS OF LIBRARIAN INVOLVEMENT

<table>
<thead>
<tr>
<th>How did these librarians learn of MotS?</th>
<th>Focal Librarians: taking on MotS outreach</th>
<th>Engaged Librarians: using MotS within an Alpha or Beta Region and some project contact</th>
<th>Broader reach librarians: others using MotS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional children’s library leader</td>
<td>Regional children’s library leader</td>
<td>Regional children’s library leader</td>
<td>Regional children’s library leader</td>
</tr>
<tr>
<td>Years 1 and 2: Regional children’s</td>
<td>Year 2 and 3: Regional children’s</td>
<td>Focal Librarians; TERC; web searches; listservs; other</td>
<td>Focal Librarians; TERC; web searches;</td>
</tr>
<tr>
<td>library leader</td>
<td>library leader</td>
<td></td>
<td>listservs; other</td>
</tr>
<tr>
<td>Year 2 and 3: Regional children’s</td>
<td>Regional children’s library leader</td>
<td></td>
<td></td>
</tr>
<tr>
<td>library leader</td>
<td>or Focal Librarians.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional children’s library leader</td>
<td>TERC and Regional Children’s Library</td>
<td>TERC and Regional Children’s Library choosing them from among Engaged Librarians</td>
<td>TERC and Regional Children’s Library</td>
</tr>
<tr>
<td>or Focal Librarians.</td>
<td>leader chose them from among</td>
<td></td>
<td>choosing them from among</td>
</tr>
<tr>
<td>Engaged Librarians</td>
<td>Engaged Librarians</td>
<td></td>
<td>Engaged Librarians</td>
</tr>
<tr>
<td>Regional children’s library leader</td>
<td>Regional children’s library leader</td>
<td>Regional children’s library leader</td>
<td>Regional children’s library leader</td>
</tr>
<tr>
<td>chose them from among Engaged</td>
<td>or Focal Librarians.</td>
<td></td>
<td>or Focal Librarians.</td>
</tr>
<tr>
<td>Librarians</td>
<td>TERC and Regional Children’s Library</td>
<td>TERC and Regional Children’s Library choosing them from among Engaged Librarians</td>
<td>TERC and Regional Children’s Library</td>
</tr>
<tr>
<td></td>
<td>leader chose them from among</td>
<td></td>
<td>choosing them from among</td>
</tr>
<tr>
<td></td>
<td>Engaged Librarians</td>
<td></td>
<td>Engaged Librarians</td>
</tr>
<tr>
<td>Project support offered from TERC</td>
<td>Limited color copies of materials;</td>
<td>Limited color copies of materials; limited e-mail support; monthly</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>small stipend; monthly mailings or</td>
<td>mailings or newsletters For Year 3 external evaluation study, small</td>
<td>For Year 3 external evaluation study,</td>
</tr>
<tr>
<td></td>
<td>newsletters</td>
<td>honorarium if willing to participate in tracking and surveys</td>
<td>small honorarium if willing to</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>participate in tracking and surveys</td>
</tr>
<tr>
<td>Commitment to MotS</td>
<td>Leading at least one MotS activity per</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>month; conducting outreach to peers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>or other informal educators; tracking</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>attendance at MotS programs and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>providing TERC with feedback</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regions</td>
<td>To date, only Alpha; Beta Focal</td>
<td>Alpha and Beta Regions</td>
<td>Alpha and Beta Regions; elsewhere in</td>
</tr>
<tr>
<td></td>
<td>Librarians will be selected in early</td>
<td></td>
<td>the US</td>
</tr>
<tr>
<td></td>
<td>Year 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of librarians</td>
<td>19</td>
<td>163</td>
<td>Tens of thousands*</td>
</tr>
<tr>
<td>Number of states</td>
<td></td>
<td>5 (soon to be 7)</td>
<td>50</td>
</tr>
</tbody>
</table>

*As discussed in Section 1C. Project reach, we are tracking broader reach in two key ways: numbers accessing materials on our website; and web searches for use of or reference to our materials of which we were unaware. We also track requests to join our mailing list; e-mails or calls from librarians with questions about materials they’ve found on our website; and when available, number of librarians who attended workshops that Focal Librarians have conducted.*
(i) Providing professional development for Focal Librarians so they could conduct workshops and outreach to other informal educators

We supported Focal Librarians through regular phone calls, occasional observations, and one full-day and seven half-day workshops. Phone calls and workshops focused on strategies for promoting math as a natural fit in children’s library offerings; allaying audience math anxieties when leading peer workshops; communicating about connecting math to familiar library routines and programs; and explaining to peers the value of including math in offerings for the elementary grades.

We had initially planned to convene Focal Librarians for a full-day workshop twice a year. Our last full-day meeting was late spring, 2009. Even with project funds available to cover travel costs, staff cuts meant librarians were unable to leave their libraries for more than a few hours at a time. Thus, we traveled to each region approximately twice during the past year for meetings with Focal Librarians. The variety of settings within states/regions and infrequent opportunities for otherwise connecting with peers made for rich discussions.

Related, Focal Librarians are primarily conducting outreach at the district level, rather than state level. Fewer librarians can afford to send representatives to state conferences, so local outreach is more productive. Focal Librarians have conducted the following outreach this year:

CT: *MotS as a library benefit in a slow economy.* Focal Librarians offered two regional workshops for peers and a further one is planned for May. These centered on the role that *MotS* can play in summer reading programming and the benefits of using *MotS* when demand for innovative learning experiences at the library is up but resources are low. Another Focal Librarian is holding a *MotS* information session at the annual state library conference. Total reach: 123 librarians. In addition, a Focal Librarian posted information about *MotS* on the statewide children’s library listserv.

WLS: *MotS as a core component of librarians’ outreach to after-school providers.* Focal Librarians led a workshop at a regional conference and are planning another in early summer and outreach to neighboring Nassau and Catskill library regions in the fall. Three Focal Librarians initiated a series of *MotS* workshops for leaders of the seven after-school programs conducted under the auspices of the White Plains Youth Bureau and follow-up trainings for staff at each after-school site. These have reached 125 providers serving about 900 children. A WLS librarian is writing an article on *MotS* for Library Journal.

Queens: *MotS takes root in a wide range of library-based youth service providers.* Three leaders (Rosanne Cerny, Leslie Taylor, and Lynn Cole) oversee distinct groups of informal educators using *MotS*: librarians, after-school educators, and those implementing programming in conjunction with NSF-funded “Science in the Stacks.” These leaders have conducted five *MotS* workshops for their staff, with librarians or after-school educators co-leading activities. Leslie Taylor has also conducted *MotS* workshops for Teen Tutors, who provide enrichment activities and homework help, and Youth Counselors, who work with the upper elementary middle grades. She plans to make *MotS* materials a focus of a summer pilot program in which youth development professionals work with grades 5-8 in the library. Collectively, about 90 informal educators have been engaged in at least one, often multiple workshops.
Eastern MA: MotS as a key summer reading program component. One of the state regional children’s library consultants invited four Focal Librarians to lead a workshop at an annual showcase of exemplary library programs, with an audience of about 45. The librarians developed a tri-fold display they used as a basis for the presentation on using MotS with the statewide “Go Green” summer theme. Statewide summer reading program coordinator Sarah Sogigian included MotS materials as a core component of the summer programming manual, available to all MA librarians for free. MA librarians have also sought publicity for MotS. Focal Librarians contributed four articles on MotS for regional MA librarian newsletters, and one librarian invited a local newspaper to cover one of their MotS family events.

To the extent possible, we are seeking to gather contact information for librarians who have been involved in trainings so that they can be included in our external evaluators’ surveys on impact next year. We have to date obtained relatively few e-mail contacts; librarian culture highly values privacy.

(ii) Supporting librarians in Beta (1) Regions in implementing MotS and in beginning to conduct outreach

Our efforts focused on supporting implementation, insuring that project materials are appropriate to a wider range of audiences, and helping librarians to build capacity so they can conduct their own outreach.

St Louis: MotS in monthly librarian meetings. Since December 2009, the head of youth services, Patty Carleton, has begun engaging librarians in doing MotS activities together as a regular component of monthly staff meetings. In total, she has involved 25 youth services librarians and 20 homework helpers at 15 city branches. Last November, a St Louis librarian presented a MotS workshop at the Active Learning Conference, organized by St Louis 4 Kids (a regional after-school training and support network), reaching 30 informal educators from various agencies. Ms Carleton included an article on MotS with the TERC url (from which the project url and activities can be accessed) in the monthly library newsletter, which is sent electronically and in print to the city’s 76,000 patrons.

San Jose: developing MotS peer leaders long-distance. Following our introduction of MotS to a small group of San Jose librarians in spring 2009, we remained in regular contact with several who use MotS at least monthly. In January, 2010, we returned to coach these librarians in leading a citywide MotS workshop for San Jose branches, and in co-leading three workshops: two for librarians in nearby San Francisco and Watsonville and one for after-school providers at the San Jose After-School Consortium. Altogether, these workshops reached 45 librarians from 24 branches, and 57 after-school providers. The library workshops also provided an opportunity to promote MotS as a way to bring innovative programming to patrons for free, a timely issue as San Jose faces a 35% budget reduction and 100 layoffs by summer (Library Journal, March 10, 2010, http://www.libraryjournal.com/article/CA6722394.html, downloaded on April 9, 2010).
(iii) Engaging leaders in Beta (2) Regions

As noted in Figure 1, we are bringing on our final two regions in a manner likely to reflect reality post-project: when materials are available online for free, but limited project support is available for using them. We are selecting regions that are typical if not below average in terms of state library funding, again, to anticipate possible circumstances post-project. Both regions have large numbers of Spanish-speakers, enabling us to explore needs and impacts among a different demographic.

**AZ.** Our newest partner is Willcox, a rural town about two hours from the Mexican border and in which the public library serves as a community and after-school gathering place. Spanish-speakers comprise about half the population. Over 25% of residents are below the poverty line, and about half at any given time are seasonal workers. Tuscon/Pima County libraries will join the project in summer, 2010. We are collaborating with Gina Macaluso of the Pima County Libraries and Holly Henley of the Arizona State Libraries to develop implementation plans for Tucson.

**FL.** Over the summer, libraries in Marion, Broward, and Lake Counties will begin participating. These include bookmobiles, affording us the opportunity to explore MotS materials suited for outreach to rural communities without a stationary library. In each county, we will work with leadership to select Focal Librarians.

Boston Public Library (BPL) Homework Helpers: unanticipated—but welcome—participants. Because of regional structure, BPL did not join the project with the rest of Eastern MA. In January 2010, Eli Gerstenlauer, BPL’s Out of School Time Programs Coordinator, contacted us about using MotS as part of the Homework Assistance Program. The program offers drop-in homework help in each BPL branch and is staffed by “mentors,” or, paid Boston high school students. Mr. Gerstenlauer was seeking to expand the program to offer educational enrichment when homework is done. Their first foray into educational enrichment involves MotS. He has been conducting MotS workshops as a component of the weekly two-hour workshops he runs for groups of 20 mentors at a time. To date, 110 mentors in 26 branches have led regular MotS activities. We are exploring feasibility of including this group in our impact study next year.

(iv) Next steps

In the coming year, we will continue working in all eight regions at the state or regional, city, and local levels, with emphasis on identifying and continuing to coach Focal Librarians in conducting outreach within their regions, identifying Beta (1) Focal Librarians and supporting them in outreach, and engaging Beta (2) Regions in implementing MotS and building capacity. We will also be collaborating with state and regional heads to ensure that MotS materials and approaches are institutionalized in resource guides and any state or regional trainings.
1B. Materials development and revision

In the past year, our materials development has centered on two areas:

(i) Materials for use with children and families

(ii) Professional development materials

In addition, we revised our website to reflect ongoing needs of librarians and other informal educators using our materials and will be continuing to update our content and search functions as the project proceeds.

Our work has been guided by several factors:

- findings from our external evaluation report;
- results of formative testing in Year 2 and the first part of Year 3;
- focus group and advisor input;
- needs of Spanish-speaking library patrons to date;
- needs of librarians who are conducting outreach to other informal educators.

Revisions are based on feedback from individual librarians that TERC gathered via 281 calls, 314 feedback forms/usage logs (often covering many MotS activities) and 42 observations, and dozens of e-mails in the period covered in this report.

(i) Materials for use with children and families

(ia) Development of materials that combine independent engagement with opportunities for rich discussion.

Librarians were especially appreciative of the MotS activities that were quick and easy to implement on a regular and re-occurring basis, and which allowed children and families to work fairly independently on their own, using interactive posters and bulletin boards, or free-standing games and activities. (p. iii)

[I’d like] even more activities that fit the randomness of library visits. (p. 25)

Findings. With increasingly stretched budgets and growing numbers of patrons, librarians seek ways to engage children apart from planned programs; 80% indicated that finding time to plan a MotS program was difficult (p. 26). Only 38% offered weekly activities for the elementary grades, suggesting that activities suited only for such programs would receive little use (p. 32).

When asked to list activities that were the “best fit” with their available time and resources, the majority cited activities that both allowed patrons to work independently and offered opportunities for mathematical discussions when time permitted:

[My ‘best fit’ is] Quick Questions. It’s easy and quick to do, and to translate into other languages. Can put near the children’s desk, and be answered by people of all ages. The librarian can easily discuss this with kids. (p. 27)

I work in a very rough generally low income area. The library is a ‘come and go,’ sort of place, so it’s hard to make kids stay and participate. (p. 33)
Two other data sources corroborate our evaluator’s results. (1) According to librarians’ implementation records, the top five (out of over 100) MoTS activities most frequently used have a substantial independent component. These comprise 36% of the total number of MoTS activities reported implemented. Shorter activities that can be incorporated into programs or used spontaneously were also particularly well-used. (2) As of January, 2010, we have been able to track access of particular pages on our website. In March 2010, independent activities, including posters, games, and Math Moments, comprised the largest category of access, with a total of 1192 downloads of which 38% were unique—meaning that users were returning multiple times to access more of these activities.

**Response.** We developed English and Spanish Math Moments—small “posters” that librarians can leave by the checkout desk, on top of book shelves, or on children’s tables. Each Math Moment offers a question that children can answer in unique ways; librarians can put out recording sheets to facilitate comparing and exploring answers. We provided our Focal Librarians with Lucite holders for the Math Moments, since some are unable to post materials on the wall.

**Next steps.** Although most of our materials development is completed, we will produce additional Math Moments along with several games that children can play independently.

**(ib) Addressing the need for materials that mesh with summer reading themes.**

**Findings.**

Many librarians described how their summer reading program was a major component of their yearly programming. (p. 33)

Some librarians indicated that in the summer, the number of children attending “dramatically” increases, and the number of programs offered to children in the elementary grades on average nearly doubles (p. 28). Summer reading is a focal point of the year for many children’s librarians; with budgets cut, they are looking for free or low-cost approaches to summer programming.

**Response.** We created guides to using MoTS with the “Make a Splash” summer reading theme used throughout most of the US in 2010 and the “Go Green” theme for MA summer 2010. Most of our activities are designed to be easily adapted to almost any theme. For instance, the project “Ride on a Slide” involves building a cardboard slide that takes 3 seconds for a toy car to traverse; our “Make a Splash” version asks librarians to present the project as construction of a water slide, and the “Go Green” version emphasizes building with recycled materials. MA incorporated our summer reading materials into their statewide guide; most of the other regions have disseminated our materials via listserv or e-mail.

In March, 2010, the summer reading program materials were the most popular download from our website after the independent activities described above.

**Next steps.** Given the finite nature of this project, we cannot continue to develop special summer reading guides. Libraries plan summer themes years in advance. We will create guides for common upcoming summer reading themes before the project ends.

---

**I don’t have time to do a program, but I can put this up. It’s very appropriate for kids of all ages, and adults and parents. Yet it triggers something they’d normally do, they know how to do. But it’s math and they don’t do math! … Two little girls were diligently counting the number of legs, and one said to the other, ‘How did you get an odd number? The chairs have four legs and the people have two.’**

—MA librarian, February 2010
Findings. Although librarians have made good use of MotS Spanish materials designed for children and families to use directly, they have conducted most MotS programs in English both as a lingua franca in multi-lingual communities and to give immigrant children a chance to hear more English. To date, librarians have reported that they would not use activity instructions in Spanish, so we have translated only a few of these.

Response. To gather more information on other MotS Spanish language needs, we held three focus groups with immigrant families that speak Spanish at home and gave them take-home MotS activities. We will interview the parents in June to determine the extent to which they used the materials, and in which languages.

Next steps. As we extend project efforts to areas in which Spanish is spoken more widely, we will explore additional translation needs. For instance, according to Gary Clement, Children’s Librarian in Willcox AZ, librarians serving recent arrivals speaking only Spanish must balance the need to help children rapidly improve their English with the need to establish a comfortable and familiar out of school learning environment—including familiar language (personal communication, March 30, 2010.)

(ii) Professional development materials

(iiia) Providing information on drawing out the math for children

Findings. Librarians, increasingly pressed for time, were more likely to read the steps needed to carry out an activity than math background. As noted above, 80% of librarians listed lack of time as an impediment to carrying out more full-length MotS programs.

Response. To fold more math into the activity steps, we added mathematical “Talk About” questions as an integral part of each activity. We also conducted focus groups and sought advisor feedback on several formats for math background, including: everyday applications of the content; adjusting the math in the activities for children of different ages; mathematical ideas with which children are grappling at different ages; and charts showing alignment with the NCTM standards.

Overall, advisors, whether math experts or informal educators, support further simplification of terms and presentation, and suggest focusing on standards-related charts. Analysis of downloads from our website corroborates these findings. In March, 2010, our math content chart was the third most popular download, following independent activities and summer reading materials.

Some terms, like ‘whole numbers,’ and ‘number system,’ might not be familiar to a layperson. We used the category ‘understanding numbers,’ for something similar in an exhibit project.

—Project advisor Karen Bertschi, OMSI, February 2010

I like the [chart] format best for librarians because it’s organized and quick to read. I really like when you put a picture of kids and speech bubbles.

—Project advisor, Sybilla Beckmann, U GA, March 2010

---

(i) Spanish materials

It was also good because we had [MotS] game boards in Spanish, and one of the moms spoke no English. The parents wanted to take home copies of the [English and Spanish] Name Game to do at home. (p. 17)
Next steps. We will be finalizing our math content information based on advisor feedback.

(iib) Addressing the mathematical needs of children of different ages

Librarians were accustomed to handling multi-age groups, typically doing so by their own adaptation of activities. About a third or more of the librarians also reported using older elementary school children in the group or teens as helpers. (p. iii)

Findings. Librarians need to accommodate a wide age range in their offerings. Even when they advertise programs for a particular age level, they cannot predict who will show up. Furthermore, many librarians seek to engage whatever children happen to be spending time in the library.

From the activity “Many Seeds”

| Grades: K - 6 | Minimum participants: 1 |
| Time: 10-20 | Suggested grouping: divide into pairs |
| Math: estimating, counting | |
| Materials: | |
| Seeded fruits/vegetables: 1 per pair | Easy: up to 15 seeds (e.g., apple, snow peas) |
| Medium: up to 50 seeds (e.g., slice of melon or cucumber) | Hard: more than 50 seeds (e.g., mini-pumpkins or pomegranates) |
| Supplies for scooping and arranging seeds (cups and spoons, newspapers) | Knife |

1. What’s inside?
   Set out the apples (or other fruits or vegetables). Have you ever cut open an apple? What’s inside? How many seeds do you think are in an apple?
   Ask for a show of hands: those who think there are about 5 seeds, those who think there are about 10, and about 50. Do you think all these apples have the exact same number of seeds? Which one do you think has the most? Why?

2. Cut and count
   Distribute an apple and any other needed supplies to each pair. An adult carefully cuts open each apple. Pairs remove, arrange, and count the seeds.

Mid to lower middle class families are those who frequent programs. Children from income-challenged families (mostly single parent households) use the library as an afterschool turf/computer access. If an attractive activity is going on, some of the kids will join in, if we have the room to include them. (This is often the case with the MotS sessions.) (p. 37).

Nearly all librarians (95%) reported that they most commonly handle multi-age groups by adjusting activities themselves (p. 35).

Response. In revising our activities, we sought to provide support for librarians who need to adjust activities to meet the needs of whomever shows up. We included ways to vary the activities in:

- materials needed
- ways in which children carry out the activity questions to discuss with children
- variations

From the activity “Make Your Own Mystery Jar”

1. Introduce the project
   Children will be making their own “Mystery Jars.” Others will estimate how many objects are inside.
   Demonstrate the process:
   - Count out objects to fill a cup.
   - Cover the cup with plastic wrap, and secure it with a rubber band.

2. Count and fill
   Distribute materials. Help children choose objects:
   Easy: Choose larger objects so 10-20 will fill the cup.
   Medium: Choose medium objects so 20-50 will fill the cup.
   Hard: Choose small objects so 50 or more will fill the cup.
(iii) Developing resources for librarian-led outreach and training

The librarians reported a sharp increase with which they could explain to colleagues ways mathematics for K-6 supported their library's mission (5% pre vs. 50% post). Slight increases were reported for their regularly discussing with colleagues the role of math in everyday life and library use (11% pre vs. 25% post), or sharing ideas on using math in story times, displays and programs (5% pre vs. 20% post). (p. 19)

The vast majority of librarians indicated that including more math in their programs for grades K-6 grades is a strong priority (90%), and did not feel that literacy, social studies and the arts were a better fit with their programs than math (65%). (pp. 19–20)

Findings. Evaluation to date has shown that librarians grew in their ability to communicate about math to children and to their colleagues. They developed a new vision for the role of math in the library and were sharing it with others on an informal basis.

As Focal Librarians prepared to present MotS more formally, via workshops, they requested our help in providing concise ways to describe the project and our advice in selecting MotS activities to present.

Response. We drafted a training module designed for a 60-90 minute workshop session and an accompanying PowerPoint presentation. Librarians can edit the PowerPoint to fit their own needs and circumstances. We had intended to develop a 10-20 minute version as well, however, all Focal Librarians who have conducted peer workshops to date—whether for 10 minutes or 1.5 hours—have noted that they would not use a shorter version. They prefer to choose among the variety of slides and activities detailed in the current version.

Further development. We continue to gather feedback from librarians using our draft training materials as the basis for workshops to determine the need for revisions and additional training materials.

IC. Project reach

We track reach among those with whom we are in direct contact (Focal and Engaged Librarians), and we estimate broader reach. Below we present data on reach to date, with the caution that we anticipate these figures are low. Because MotS activities are presented in a public arena, tracking exact numbers who have participated is not always possible, nor is determining how many participants are repeats. Since materials are available for free to download from our website, librarians with whom we are not in contact have access to them.

(i) Reach among Focal and Engaged Librarians

In the past year, we gathered data on MotS reach from 100% of our Focal Librarians and 42% of our Engaged Librarians (68 of 163). Thus, the following data reflects MotS implementation from 87 librarians at a total of 85 branches/libraries.
Number of children and families participating in MotS programs. This group reported implementing MotS activities with 25,580 children and 4,651 parents. A total of 204 teens (paid or volunteer) and 60 adult volunteers helped to implement these activities. Librarians have conducted a total of 27 MotS events explicitly for families (vs child-focused events that parents decide to attend), involving 566 children and 147 parents (totals included in reach figures above). Family events typically consisted of several MotS activities (average 3.2) and lasted between 1 and 3 hours.

Number of children and families participating in self-directed MotS activities. These 87 librarians estimate a further 45,595 children and 11,390 adults have used MotS calendars, played MotS games, contributed to MotS posters, or explored questions on Math Moments. Librarians, often required to track participation at library events, estimate interaction with book displays, and record use of handouts and other materials, submitted carefully derived estimates, as their explanatory notes accompanying tracking logs reflect.

Number of informal educators reached. Focal Librarians have conducted 29 workshops (alone or with TERC) further reaching 602 informal educators, including librarians, after-school providers, and homework helpers.

Additional TERC-led outreach. In addition to supporting librarians in conducting their own workshops, we provided workshops on MotS at a large family literacy event hosted by the Boston Children’s Museum, conducted outreach at the Cambridge Science Festival, and contributed to TERC’s booth at the National and Northeast Regional NCTM conferences. In total, we distributed MotS materials to 410 families and over 100 math educators.

Considerations regarding accuracy of data that librarians reported:

Many repeat visitors. Librarians record numbers attending programs but not who attends. About 65% of librarians report having a “core group” of elementary grade children who regularly come to the library in the after-school hours (p. 32). These regular visitors may have been counted more than once.

We don’t have complete data. As noted above, we did not receive data from all Engaged Librarians.

Impacts beyond specific MotS activities. The project is leading to a shift in practice, in which librarians report recognizing and building upon math opportunities as they interact with patrons. Our data only includes implementation of specific MotS activities; we did not ask them to track the number of times they initiated their own activities similar to those we provided.

Librarians also reported changes in the way they interacted with children that extended beyond the specific MotS programs they conducted. At least half the librarians reported either “some” or “a lot of” change in the way they lead craft activities (74%), how they ask children questions (68%), and the way they lead story times (53%). Close to half (45%) indicated that they had designed and used some of their own activities that were based on, or similar to those, in MotS. A third or more indicated “some” or “a lot of”
change in the types of books they chose to feature in story times (42%) and how they talked with children about books (32%), while about a quarter changed how they showed children around the library (26%). (p. 19)

(ii) Broader reach

We track impact beyond those librarians with whom we are in contact in two key ways:

- our website
- web searches for use of or reference to our materials.

In addition, we maintain a mailing list of 1042 informal educators to whom we e-mail monthly English and Spanish math calendars, project updates, and suggested activity variations. Several dozen of those on our list, in turn, send our mailings on to peers in their regions or professional networks. We regularly receive requests to join our mailing list (105 in the past year) from librarians and other informal educators.

(iia) Tracking access to our materials with Google Analytics.

In mid-January, 2010, we gained the capacity to gather data use of our website. Since that period, we have had an average of 1500 hits a month (from 1300 to 2100). Below we report statistics for the month of March 2010. Extrapolating the data to a full year suggests nearly 20,000 unique visitors.

WEB DATA FOR MARCH 2010

Who visits and for how long?

1,639 visits total, from the US (all 50 states) and 38 other countries

<table>
<thead>
<tr>
<th>Unique visitors</th>
<th>68%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeat visitors</td>
<td>32%</td>
</tr>
<tr>
<td>Average number of pages viewed per visit</td>
<td>6.7</td>
</tr>
<tr>
<td>Average time on site</td>
<td>4 min., 20 sec.</td>
</tr>
<tr>
<td>Bounce rate</td>
<td>34%, suggesting 1082 visitors explored the site</td>
</tr>
</tbody>
</table>

Note: Web hit statistics can appear artificially inflated if they include “spam” and visitors who view the home page but do not access other pages on the site. To rule out such visitors, we track “bounce rate”—those who go no further than the home page—and exclude them from our data. In March, 2010, this rate was 34%. (According www.googleanalytics.com, developers should strive for bounce rates of 20%-35%—the lower the better, with below 20% almost impossible to achieve).
How do visitors come to our site?

![Pie chart showing traffic sources]

- 44% direct Traffic (entering our URL directly)
- 37% referring sites (clicking on a link on a site recommending us)
- 19% Search Engines (conducting a search for informal math activities)

Where were visitors from?

<table>
<thead>
<tr>
<th>Country Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>94% from the US, all 50 states</td>
<td></td>
</tr>
<tr>
<td>97% from English-speaking or Spanish-speaking</td>
<td></td>
</tr>
<tr>
<td>countries</td>
<td></td>
</tr>
<tr>
<td>58% of US visitors from Alpha or Beta Region</td>
<td></td>
</tr>
<tr>
<td>states</td>
<td></td>
</tr>
</tbody>
</table>

Which web materials did visitors often access? Top 10 of 277 pages.

<table>
<thead>
<tr>
<th>Page</th>
<th>Type of Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Downloads of all activities (vs choosing and downloading individual activities)</td>
</tr>
<tr>
<td>2</td>
<td>Geometric strategy games</td>
</tr>
<tr>
<td>3</td>
<td>Monthly math calendars</td>
</tr>
<tr>
<td>4</td>
<td>Guide to using MoS with summer reading programs</td>
</tr>
<tr>
<td>5</td>
<td>Math Moments</td>
</tr>
<tr>
<td>6</td>
<td>Activity search</td>
</tr>
<tr>
<td>7</td>
<td>Posters</td>
</tr>
<tr>
<td>8</td>
<td>Math content chart</td>
</tr>
<tr>
<td>9</td>
<td>Ride on a Slide</td>
</tr>
<tr>
<td>10</td>
<td>Project background information</td>
</tr>
</tbody>
</table>

* Independent activity: Children may engage in the activity independently, with occasional adult involvement to encourage reflection and sharing of strategies, results, and inherent mathematical content.
Visitors from all over the nation and world have explored MoTS materials. Six percent of visitors in March downloaded all of our activities. Others chose and download individual activities. Reach extended substantially beyond the states in which Alpha and Beta Regions are located: 42% of US visitors accessed the site from other states.

Data on pages most often accessed align both with librarian self-reports and external evaluation findings. Librarians are particularly drawn to activities that mix independent engagement with opportunities for discussion. Visitors access adult-led projects, but do so with less frequency.

Although we have focused dissemination on librarians, we believe that a broader range of educators access our site. We receive e-mails from librarians, after-school educators, museum educators, schoolteachers, and parents who are using our materials. The frequent downloads of our math content chart may indicate use by teachers or after-school academic support programs (for instance, 21st Century Learning Centers or library-based homework helpers such as those at BPL).

**Next steps.** In Year 4, we will engage a senior library leader as a consultant to communicate about MoTS to children’s librarians through American Library Association networks. Rosanne Cerny, the recently retired director of Queens Public Library children’s department, is likely to assume this role. Advisors will also support dissemination. We were invited to contribute MoTS activities to the SMILE (Science and Math Informal Learning Educators pathway) database, supported by NSF and NSDL. We will be submitting over 100 of our activities in summer, 2010. SMILE activities will be promoted widely nationwide to informal educators of all kinds.

We also wanted to note a dissemination approach we began with but largely abandoned: a listserv. At the project outset, we observed that many states have active listservs for children’s librarians and so, we initiated a math-themed library listserv. Participating librarians contributed insightful anecdotes about ways they used MoTS, but primarily only when we asked them to do so. We approached advisors and children’s library leaders for advice. They reported that librarians typically use listservs to share ideas about books, regulations, and performers; they do not tend to share programming ideas. (Sue Cormier, Director of Children’s Services, CT State Library System, personal communication January 6, 2010; Judith Rovenger, Youth Services Coordinator, Westchester Library System, personal communication March 22, 2010). Ms Cormier also noted that sharing tips on successful programs can seem akin to bragging or self-promotion and is thus at odds with librarian culture.

**(iii) Web searches for use of or reference to our materials**

In March, 2010, we conducted a web search for evidence of use of our project materials beyond sites with which we have been in contact. We searched both for Math off the Shelf and Mixing in Math, since our project materials are known by both names. A summary of findings is below. We tried to exclude references to our materials specifically related to after-school programming not based in the library, on which we focused in prior work. However, this was not always possible: many educational sites serve a wide range of formal and informal audiences; and some out of school training...
agencies, such as St Louis 4 Kids, reach librarians, after-school providers, and museum educators. Nonetheless, we are confident that a substantial number of those using our materials are librarians. According to our Google Analytics data, 26% of visits to our site use library service providers. The majority of the rest are commercial communications providers (such as Verizon and Comcast), suggesting access from personal accounts; visitors using museum, public school, after-school, and university service providers also access our site.

The data below, along with our site access data, indicates that many people—whatever their role in supporting children’s learning—are regularly accessing our materials, and that agencies other than TERC are playing a substantial role in spreading Math off the Shelf.

**FIGURE 3: “THIRD PARTY” OUTREACH—USE/REFERENCE TO OUR MATERIALS THAT WE DID NOT INITIATE**

<table>
<thead>
<tr>
<th>Type of program/site</th>
<th>Spread</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events for children and families at libraries and other informal learning venues</td>
<td>Programs, alone or in series, in four states, only one of which includes an Alpha/Beta Region.</td>
<td>South River NJ Public Library offered a two-part <em>Mixing in Math</em> program for 6-9 year olds in January, 2010, combining several of our data-related activities with graphic novel creation.</td>
</tr>
<tr>
<td>Professional development programs for informal educators</td>
<td>Workshops, alone or in series, in twelve states, two of which include an Alpha/Beta Region.</td>
<td>The Family Resource Center of South Dakota State University is offering workshops based on our materials, intended for a broad range of out-of-school providers. The next one is scheduled for May 10, 2010.</td>
</tr>
<tr>
<td>Formal education programs; informal-formal collaborations or state-sponsored programs</td>
<td>17 statewide or national sites, including schools, adult numeracy, and 21st century learning centers; dozens of regional and local sites</td>
<td>Volunteers for Adult Literacy in Florida, a group that provides free library-based literacy and numeracy tutoring to adults, posted a link and recommendation for our materials on their blog in January, 2010.</td>
</tr>
<tr>
<td>Education resource listings and search engines, including government, non-profit, and commercial sites</td>
<td>38 English-language sites; 6 Spanish-language sites; 1 bilingual site</td>
<td>The family-friendly search engine “experts123.com” lists commonly asked questions, including verbatim several of our Spanish and English “space” and “animal” poster questions developed for integrating math into library summer reading programs in 2008 and 2009. This suggests library patrons were using the search engine to find investigate the poster questions.</td>
</tr>
</tbody>
</table>
1D. External evaluation (This section contributed by Char Associates. Please also see attached evaluation report.)

Annual Evaluation Update for Math off the Shelf Year 3
(May 2009–April 2010)

Char Associates, an independent evaluation firm based in Montpelier, Vermont led by Dr. Cynthia Char, is serving as the external evaluator for the Math off the Shelf project. Dr. Char has served in this capacity since the project’s outset in 2007.

Our timing of data collection efforts and evaluation reports is based on the natural cycle of librarian participants and how they frame their work and programming. We have found that librarians tend to be organized by the academic year (i.e., going from September through August), with some of the busiest periods being the summer months with libraries’ summer reading programs. Thus, in the current month of April 2010, we are in the final months of data collection for what we consider “Project Year 3”. While we have engaged in a series of research activities the past 12 months (described below), we are about to embark on our major research effort for Year 3, which is a Spring 2010 librarian survey to multiple regions across the country that have been participating in MoS, during Years 1-3.

Evaluation activities during Year 3

The first six months of Year 3 (May–October 2009) were largely focused on data analysis and the preparation of our Year 3 report (submitted November 2009). We analyzed both quantitative and qualitative data yielded from a wide range of data sources collected during Year 2, including pre- and post-program survey data from participating MotS librarians, as well as from a comparison group of librarians.

Survey data was gathered from 115 librarians representing 109 different cities and towns in the Northeast (67 participating MotS children’s librarians from 61 different cities and towns in the Northeast, and 48 children’s librarians from 48 different cities and towns in Massachusetts, in our comparison group.)

Beginning this fall, our evaluation work has expanded to include new regions that have actively joined the project in Year 3, including San Jose, California, and St. Louis, Missouri. Thus, our Spring 2010 survey will go out to additional regions (Metrowest MA and Northeast MA; Connecticut; Westchester, NY; Queens, NY; San Jose, CA; St. Louis, MO.) Our Year 3 survey is also tapping an “Other” category of participant, individuals who have learned about Math off the Shelf through its website or list-serve, through librarian-led trainings, or other more informal points of contact.

During the past seven months of Year 3 (October 2009–April 2010), Char Associates has engaged in a range of additional evaluation activities, including:

Electronic Surveys

• Development and administration of Fall 2009 baseline to new Year 3 participating MoS librarians in two regions (October–December 2009)
• Development and administration of Spring 2010 post-program surveys to participating MotS librarians in 8 regions (February—May 2010)

• Development and administration of Spring 2010 post-program surveys to participating MotS after school homework helpers in 1 region (March—May 2010)

Observations

• Observations of six of the project’s regional library meetings, involving participants in six different regions (Queens NY, October 2009; Chelmsford, MA November 2009 (involving both MetroWest and Northeast MA regions); Westchester NY, November 2009 and March 2010; Connecticut, January 2010; San Jose, January 2010)

• Observations of MotS library events and site visits, in 3 regions (Framingham, MA November, 2009; Thompson, CT, January 2010; San Jose, CA, January 2010)

Focus Groups and Interviews

• Focus group sessions with librarians and homework helper staff (Queens, NY, March and April 2010)

• Interviews with regional leaders (Queens, NY, December 2009 and January 2010; interviews with additional leaders from other regions to be conducted in May and June 2010)

Written Documents

• Regular, on-going review of TERC’s library observation field notes, phone calls, and library meetings notes, gathered by TERC’s formative research team and project staff

The evaluator has also engaged in regular bi-weekly phone meetings and e-mail communication with project staff throughout this past year.

Independent of the project, Dr. Char also attended a NSF-sponsored invitational working conference for STEM researchers in August 2009 (2020 Vision: The Next Generation of STEM Learning Research) at Oregon State University, co-hosted by John Falk and Lynn Dierking.

External evaluation reports

Char Associates produced a total of three written reports during the past 13 months. In Spring 2009, we submitted a report of preliminary findings of baseline surveys and data gathering from Years 1 and 2, submitted as part of the MotS Year 2 (April 2009) report. We then produced a short summary of preliminary evaluation findings based on the Spring 2009 post-program surveys, so that it was available during a project site visit by NSF Program Officer Sylvia James in July 2009. Finally, we submitted a full evaluation report of all Year 2 findings, in November 2009 (Evaluation Report for Math off the Shelf, Year 2, Char and Foote, 2009). Highlights of our report can be found in our Year 3 Evaluation Executive Summary.

Upcoming evaluation work

We are currently engaged in data collection for our major Spring 2010 survey (launched on April 19, 2010), with all data anticipated in by early June. Analysis of data from the surveys, along with other data sources collected
throughout this past year, will be conducted this summer, with final phases of writing and final production work done in early fall. Our Year 3 evaluation report will be submitted in October 2010.

As we outlined in last year’s report, a major focus of the Year 3 evaluation will be to examine whether participating MotS librarians have been able to sustain the clear growth in offering mathematics materials and programs through their libraries demonstrated during Year 2, given the demanding economic climate and stresses placed upon libraries, as publicly-funded community-based institutions. It will also study how the MotS project reaches librarians in additional regions cross the country beyond the northeast, and for all regions, how libraries’ subsequent offerings and programs have an impact on children and families in their local communities.

In addition to working on our Year 3 report this summer, we will be planning our summative evaluation activities and instruments for Year 4, the final year of the project. Aside from a continued focus on project impact on librarians and their communities, we anticipate that some of this research will further investigate program elements we have begun to explore during Year 3. For example, we will continue to examine the extent to which direct technical support and encouragement—either from TERC and/or a regional library leader or administrator—plays a significant facilitating role in enhancing and sustaining mathematical offerings in libraries. We will also examine the extent to which other after-school staff working in libraries (such as homework helpers), might provide additional human resources to facilitate informal mathematics learning in libraries.

2. Major Findings

Our external evaluation report, addressing impact through the end of Year 2 is attached. Key findings are woven into discussion of major project activities above. Below we underscore several threads supported by evaluation data.

2A. **Librarians, despite budget cuts, are using MotS to bring informal math experiences to a very diverse audience; potential for repeat math experiences is strong and growing**

Libraries offered tremendous opportunities to reach highly diverse audiences. Many librarians described the wide ethnic diversity of their communities, as well as the special challenges posed by multi-lingual audiences and immigrant families.

In addition to the significant challenges in serving their diverse local communities well, librarians mentioned how the downturn in the economy has significantly affected their library budgets, staffing, programming and ability to serve their communities. In their post-program surveys, 90% of the librarians indicated that they had observed changes in their library, which they attribute to the tighter economic climate, and which is in stark juxtaposition to the optimism described in baseline surveys around available staff time and resources. (p. 29)

Despite budget cuts, staff reductions, and increases in patrons, librarians reported incorporating a great deal more math their offerings for the
elementary grades children and their families. For instance, 74% of librarians reported infusing more math into craft activities because of their participation in MotS, 68% integrated more math into the way they asked questions of children, and 45% went beyond MotS to create their own similar math activities. (p. 19)

The majority of beneficiaries of this additional math were children and families from low-income, ethnically diverse, and/or immigrant families; we intentionally focused on regions and library sites that served this demographic. At about 65% of these libraries, a “core group” of elementary grade children regularly come to the library in the after-school hours (p. 32). Increasingly, with the economic downturn, more children and families are making regular library visits (p. 39). In Year 4, we will be conducting focus groups to explore the impact of multiple experiences with MotS (in the library, with MotS take-home materials, and if possible, at after-school programs) on attitudes toward math and frequency of engaging in math-related activities at home.

2B Librarians gained in ability to communicate about informal math to multiple audiences

Well, first, I never would have thought of blending math into library activities, and second, my understanding of learning math from a kid’s perspective has changed. I used to think math had to be obvious, but I’ve seen that, applied to real life situations, it can be fun and natural. (p. 20)

Librarians reported changes in their attitudes toward math in the library as a result of project participation. Nearly all (90%) said their thinking about the role of math in children’s library offerings had changed. An equal percent (90%) indicated that including more math in library offerings is now a strong priority (p. 21).

Librarians actively shared their new views about math with children and with librarian colleagues. The majority (70%) reported substantial changes in ability to explain to children how math is relevant to library use, and nearly half (45%) noted that they now routinely point out the role of math in everyday life to children (p. 18). Half (vs 5% baseline) were now able to explain to peers how math for the elementary grades fit the library mission, and many reported frequently sharing ideas on using math in story times, displays and programs (pp. 19-20).

To date, external evaluation has not probed gains in math-related communication with parents, but opportunities for such increased, as librarians reported including twice as much math in family programs (p. 16). Anecdotal evidence suggests that indeed, librarians did gain skills in communicating about math to parents:
The parents were a bit confused about how the “pattern poetry” was math. We talked about patterns and sequencing and shape recognition and they seemed satisfied. They really liked the name game which was the last thing we did and by then they seemed to be able to get what was “math” about it. (p. 17)

Likewise, anecdotal evidence suggests that librarians gained in ability to communicate about math to after-school educators. Three Focal Librarians described what they learned from leading a series of MotS workshops for after-school educators in White Plains, NY. All had expertise in leading literacy workshops to after-school educators, but they found a critical difference with MotS: it’s vital to engage workshop participants in doing and discussing activities, in order to break stereotypes of math as a worksheet-laden, number focused discipline. (Francine Vernon, Coordinator of Library Youth Connection Program, Westchester Library System Deb Gaffey, Children’s Librarian, White Plains Public Library NY, and Rosemary Rasumssen, Manager of Children’s Library Services, White Plains Public Library, NY, personal communication, March 22, 2010).

Year 4 will provide us with an opportunity to explore ways that librarians’ math-related knowledge, practices, and understandings changes as they communicate with varied audiences as a natural course of their work, and in some instances, as they conduct workshops for librarian peers and other informal educators.

2C. Librarians attributed a great deal of their success with MotS to the project materials

When presented with a list of possible factors that might optimize their success of MotS implementation, almost all of the librarians cited various aspects of the MotS materials themselves as either important or very important. Librarians specifically cited the importance of the range of MotS activity formats (95%), the quality of the MotS materials (85%), and access to the MotS website. (85%)

In-person librarian meetings (58%) and technical support (55%) offered by the TERC project staff were also regarded as important, but less critical. Librarians also reported the importance of support from their host libraries, either from fellow library staff (63%) or their library administrator (60%). (p. 23)

Although librarians valued meetings with TERC and peers, and they gained from the phone support TERC provided, they found the materials themselves particularly important in ensuring successful implementation. This finding bodes well for use of project materials both by the potential tens of thousands of those who are downloading them from our website and for Alpha and Beta participants post-project—when they will no longer have access to TERC support.

In the coming year, we will have an opportunity to further explore the role of materials as our external evaluation will include Beta sites, with several sites receiving limited support from TERC and the rest receiving almost none. Evaluation will also address approaches to institutionalizing MotS among these different groups.

I feel much more open to branching into “non traditional” library activities and looking for the connections to math and literacy. I have more confidence that I will be able to identify and communicate these connections to kids. I can talk about math without feeling/acting like a classroom teacher. I can use my creativity in a broader arena with math activities. (p. 41)
We find that as project materials—in particular, activities that can be used spontaneously or with little adult intervention—become institutionalized and well-integrated with regular library practices, reporting becomes a challenge for some librarians. For instance, we were surprised when one librarian who had appeared enthusiastic about MotS reported to us that over the summer of 2009, she had not been able to use any of our activities because of staffing constraints. On further probing, we found that although she had not conducted any full-length programs based on MotS, she had been using MotS activities multiple times each week. These had become so well-integrated into her regular practices that she had forgotten to mention them:

*I use How Many in a Minute and Quick Questions routinely. We use How Many in a Minute on our outreach visits. We’ll do it when we come together to warm up. They love it. They go wild. Why do some people do more [e.g. jumping jacks, hand claps, or whatever it is they’re tallying per minute], different numbers of times, most, least. Quick Question of the week. We did that all summer, every week. They love it.* (Kari Hammond, Children’s Librarian, Lowell Public Library, MA, personal communication, November 2, 2010)

Likewise, Eli Gerstenlauer of Boston Public Libraries reflected that would like MotS to become second nature to the 110 Homework Helpers he oversees:

*My hope is that over the course of the next year, these things become incredibly standardized. I want [MotS] to become the first thing that Homework Helpers think of when the kids need something to do.* (personal communication, February 24, 2010)

As we look ahead to the coming year, we will be exploring the variety of ways that MotS becomes part of regular library practice, as well as its impact on librarians and the many peers and patrons they reach. We anticipate that we will be carrying out this work in continued poor if not worsening economic climate for libraries. Thus, evaluation will pay special attention to the role that MotS can play in enabling librarians to bring math to a wide and diverse audience in spite—or because—of staffing and budget constraints.

As Year 2 concluded with the advent of summer 2009, many librarians stated that the economic downturn they had experienced the past year has significantly and adversely affected their library budgets, hours, staffing levels, programming and overall ability to serve their diverse local communities well. They expressed concern that library cuts would continue in the months to come. As a result, librarians were particularly appreciate of MotS activities that did not require a structured children’s program as the method for delivery, as they were anticipating the need to reduce their level of children’s programming in the coming year. (p. 42)
Evaluation Report for Math off the Shelf
Year 2

Cynthia A. Char and Michael Foote
Char Associates
Montpelier, VT

November 2009
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Executive Summary

Math off the Shelf (MotS) is a four-year, NSF-funded Informal Science Education (ISE) project designed to develop an infrastructure for mathematics learning utilizing public libraries across the country. The project, led by TERC, a not-for-profit education research and development organization in Cambridge, Massachusetts, has just completed its second year. Char Associates, an independent evaluation firm based in Montpelier, Vermont, is serving as the external evaluator for the Math off the Shelf project.

The three major foci of the Year 2 evaluation are to:

1) gather background information on public libraries to add to the knowledge base on public libraries’ potential as informal learning settings for children,

2) gauge children librarians’ current practices of incorporating mathematics in their programming and interactions with child and family patrons,

3) assess the initial impact of the MOTS project on participating librarians’ attitudes, behaviors, and library practices fostering mathematics.

A core set of research activities in Year 2 was centered on the administration of baseline and post-program surveys to librarians. Baseline surveys were collected from a total of 67 children’s librarians (19 librarians participating in MotS, and 41 librarians in a Massachusetts comparison group). A post-program survey was administered to 29 MotS librarians, to gauge the project’s initial impact on promoting mathematics in libraries.

Report findings are organized in three separate sections: Common Library Practice and the Inclusion of Mathematics; Incorporation of Mathematics in MotS Librarians’ Programs and Practices; and Background on Library Staffing, Demand, Programs and Audiences.

Common Library Practice and the Inclusion of Mathematics

In general, the baseline survey revealed that librarians report relatively low levels of math-related program practices and behaviors with elementary school age children in their typical library practice. Explicit presentation of mathematics tended to be limited to counting stories and songs with younger children (preschoolers and toddlers), with some implicit inclusion of mathematics in hands-on crafts and cooking activities.

Use of books relating to mathematics primarily focused on ones that explicitly featured math, such as counting books, with rare utilization of fiction or non-fiction with non-math themes. Summer reading programs to encourage children to read during the summer months, which constituted a major emphasis in each library’s yearly programming, often involved children keeping track of the number of books that they had read, or hours they had spent reading. Use of mathematics in crafts activities was generally implicit, and tended to be limited to counting and measurement, rather than
including geometry or patterns. The vast majority of librarians’ descriptions of using mathematics pertained to numbers, numerals, counting, and measurement.

Librarians also reported low levels of math-related discussions with library colleagues. This was despite the fact that a number of librarians described how they were required to use mathematics as part of their work to track and monitor their own programming for outside agencies and grant writing.

While librarians reported low incidence of currently including mathematics in their children’s programming, many were receptive to the idea of learning more about how mathematics could play a greater role in their programming for grades K-6. Most did not feel a lack of time or staff to offer math-related programming, nor believe that the most appropriate way for libraries to support children’s mathematical learning need be limited to homework help.

**The Incorporation of Mathematics in MotS Librarians’ Programs and Practices**

MotS librarians reported a clear increase in regularity with which they engaged a range of mathematics-related behaviors in their interaction with children and colleagues. There was a sharp increase in the frequency with which MotS librarians featured mathematics in certain types of library offerings, especially story hours and interactive posters, and more than half the librarians indicated that they at least occasionally featured math in crafts, handouts, book displays, and family programs.

Librarians indicated that they now could readily explain to children how math is relevant to using the library and routinely pointed out the role of math in everyday life to children. Changes in their interactions with children also extended beyond specific MotS programs, with most reporting changes in the way they generally lead craft activities and story times, and how they ask children questions. Close to half indicated that they had designed and used some of their own original activities based on MotS.

Almost all the librarians indicated that their thinking about the role of math in library activities for grades K-6 had changed through their participation in MotS. Librarians described a wide range of changes, including broader notions of mathematics and its connections to daily life, a heightened awareness of mathematical opportunities in their libraries, and increased efforts and intentionality in incorporating mathematics in their library programs and routines. MotS librarians were highly positive about the role of mathematics in the library, and reported a sharp increase with which they could explain to colleagues ways mathematics for K-6 supported their library’s mission.

Most librarians indicated that they felt at least somewhat successful in using MotS materials to promote elementary school children’s learning and enjoyment of mathematics, and that they found it easier to implement MotS than they did six months ago. Regarding factors optimizing their success of MotS implementation, the vast majority of librarians specifically cited the importance of the range of MotS activity formats, the quality of the MotS materials, and access to the MotS website. Having
insufficient time to plan MOTS activities was by far the single largest factor seen as hindering implementation, even though they had initially believed (in their baseline surveys) they had the staffing and time to offer such math programming.

Librarians were especially appreciative of the MotS activities that were quick and easy to implement on a regular and re-occurring basis, and which allowed children and families to work fairly independently on their own, using interactive posters and bulletin boards, or free-standing games and activities. In-person librarian meetings and technical support offered by the TERC project staff were also regarded as important by over half the librarians, as was the importance of support from colleagues and supervisors in their host libraries.

**Background on Library Staffing, Demand, Programs and Audiences**

Libraries come in “many shapes and sizes,” and offer tremendous opportunities to reach highly diverse audiences. Libraries typically serve patrons of a wide range of ages and, in most communities, serve many families who may be economically struggling. Many librarians described the rich ethnic diversity of their communities, as well as special challenges posed by multi-lingual audiences and immigrant families.

Participating libraries were highly varied in their staffing levels for children’s services, ranging from only one staff member to fourteen. Over half of our respondents were the sole children’s librarian in their library. Staff often struggled with the demands of handling the circulation desk in addition to their many other responsibilities, feeling it detracted from the time and energy needed to offer programming.

Libraries typically offered a variety of different activities for elementary school-aged children, including special family programs, regular monthly and weekly programs, homework assistance, and summer reading programs. The number of regular weekly programs varied widely by library, averaging 2-3 weekly programs during the school year, and 3-4 weekly programs during the summer. Offering multi-week (3- to 6-week) programs for which children’s attendance across weeks is expected and/or encouraged was somewhat atypical. Internet access was readily available to children in all libraries.

While most libraries reported providing some type of program to community-based groups, these offerings were often sporadic and consisted of a single special session or visit, rather than a sequence of program offerings or based on an on-going relationship between the two organizations.

Librarians were accustomed to handling multi-age groups, typically doing so by their own adaptation of activities. About a third or more of the librarians also reported using older elementary school children in the group or teens as helpers.

There was a relatively good correspondence between what librarians see as the most important aspects of their job, and how they spend their time. They regard the most important aspects of their job as focused on their book collections – maintaining and
offering a high quality children’s book collection, and helping children and families use the collection. Their next highest priority concerned their provision of children’s programs. Relatively low priority and amounts of time were given to homework assistance.

As Year 2 concluded with the advent of Summer 2009, many librarians stated that the economic downturn over the past year has significantly and adversely affected their library budgets, hours, staffing levels, programming and overall ability to serve their diverse local communities well. They expressed concern that library cuts would continue in the months to come. As a result, librarians were particularly appreciative of MotS activities that did not require a structured children’s program as the method for delivery, as they were anticipating the need to reduce their level of children’s programming in the coming year.

Our Year 3 evaluation will continue to chart the extent to which MotS librarians are able to sustain the clear growth in offering mathematics programs in their libraries that they have demonstrated this past year. It will also examine how some participating librarians take on increased leadership roles to help train and support fellow librarians to enhance children’s mathematical learning in their libraries. Furthermore, the Year 3 evaluation will study how the MotS project reaches and trains librarians in additional regions beyond the Northeast, and the subsequent impact of the project on the librarians’ programs, practices, institutions, and communities.
Evaluation Report for Math off the Shelf, Year 2

Cynthia Char and Michael Foote
Char Associates
November 2009

INTRODUCTION

Math off the Shelf (MotS) is a four-year, NSF-funded Informal Science Education (ISE) project designed to develop an infrastructure for mathematics learning utilizing public libraries across the country. The project, led by TERC, a not-for-profit education research and development organization in Cambridge, Massachusetts, has just completed its second year. Char Associates, an independent evaluation firm based in Montpelier, Vermont, is serving as the external evaluator for the Math off the Shelf project.

As noted in our Year 1 report (Char, 2008), there is a surprising paucity of existing research on the use of public libraries as learning settings for children, much less, for their learning in mathematics. As a result, a major focus of the Year 2 evaluation is gathering baseline information on existing children’s program practices in libraries, including the extent to which mathematics was featured in current programming and librarian practice. A significant portion of the Year 2 evaluation is also devoted to studying the initial impact of the MotS project on participating librarians’ attitudes, behaviors and programs relating to mathematics.

Thus, the three major foci of the Year 2 evaluation are to:

1) gather background information on public libraries to add to the knowledge base on public libraries’ potential as informal learning settings for children,

2) gauge children librarians’ current practices of incorporating mathematics in their programming and interactions with child and family patrons,

3) assess the initial impact of the MotS project on participating librarians’ attitudes, behaviors, and library practices fostering mathematics.

Char Associates engaged in a range of evaluation activities during Year 2, including:

• Development and administration of baseline and post-program surveys to participating MotS librarians,

• Administration of baseline/background survey to a comparison group of non-project librarians,

• Observation of the project’s three all-day librarian meetings, involving participants from all four alpha regions (Massachusetts, Connecticut, Westchester NY, and Queens, NY) (November and December 2008, April 2009),
• Document analysis of “participant reflection” forms administered at the end of the project’s all-day librarian meetings, and

• Regular, on-going review and analysis of TERC’s library observation field notes and librarian meeting notes, gathered by TERC’s formative research team and project staff.

In addition to the above evaluation activities, part of the evaluator’s focus has been on working collaboratively with TERC project staff on an ongoing basis, to enhance and improve their formative research and materials development efforts. The evaluator has engaged in regular bi-weekly phone meetings and e-mail communication with project staff throughout this past year, as well as led a staff meeting on program evaluation.

Through these exchanges, the evaluator has worked with project staff to encourage:

• creation and refinement of a logic model of the project and its impacts;

• development of an initial rubric of librarian “stages” of mathematics practice in libraries;

• streamlining as well as bolstering of formative research techniques, including modification of activity-specific feedback forms, creation of additional activity log records, and utilization of regular phone “debriefing” meetings between project staff and librarians;

• creation of a reflection feedback form, to be used at the end of semi-annual MotS librarian meetings, to assess librarians’ professional growth and project impact; and

• production of a hard-copy binder of project resource materials with index to distribute to librarians (rather than relying on transmission of electronic PDF files for continuous updating of materials).

**Major Research Activities and Organization of the Report**

A core set of research activities in Year 2 centered on the administration of baseline and post-program surveys to librarians.

During the first part of Year 2 (Fall 2008), we began collecting baseline surveys to gather background information on libraries’ current practices surrounding their children’s programs, including the extent to which mathematics was featured in programming and librarian practice. Surveys were collected from a total of 67 children’s librarians: 19 librarians participating in MotS and 41 librarians in a Massachusetts comparison group (referred to in this report as MACG).
During the second half of Year 2 (spring 2009), a post-program survey was administered to 29 librarians who have been participating in the MotS project this past year, to gauge the project’s initial impact on promoting mathematics in libraries. The spring data sample consisted of a total of 28 librarians.

Our survey findings are presented in three separate sections in this report. The first section (Common Library Practice and the Inclusion of Mathematics) pertains to current practices in children’s librarians’ programs, resources and support for children’s mathematical learning. Findings in this section are based on our pre-program/baseline surveys from MotS librarians and the MACG.

The report’s second major section (Incorporation of Mathematics in MotS Librarians’ Programs and Practices) is devoted to findings yielded from our comparison of the pre- and post-program surveys, along with other spring data, assessing the initial impact of the MotS program on participating librarians.

The third section (Background on Library Staffing, Demand, Programs and Audiences), based on baseline survey data from MotS and MACG librarians, pertains to additional background information on libraries and their design implications relating to children’s programs, library staffing and resources.

**Sample and Methods**

**Sample and Method for Baseline Surveys:** Baseline surveys were collected from a total of 67 children’s librarians, representing 61 different cities and towns in the Northeast (in Massachusetts, Connecticut and New York). We administered surveys to two groups of librarians: librarians who were project participants in Math Off the Shelf, and a comparison group of librarians (MACG). (See appendix for copies of the survey instruments.)

Librarians in four different regional library systems in Massachusetts, Connecticut and New York participated in the project in Years 1 and 2. Due to the fact that librarians continued to join the MotS project at various points throughout Years 1 and 2, we administered multiple rounds of initial baseline surveys, with librarians receiving a survey shortly after they formally agreed to participate in the project. Three rounds of baseline surveys (summer 2008, fall 2008, and winter 2009) were administered to a total of 25 librarians. An initial set of six librarians (representing six different towns/cities in the tri-state area) completed a short paper-based survey in summer 2008. Nineteen librarians, representing 13 cities and towns in the tri-state area completed a more comprehensive electronic baseline survey in the fall 2008 and winter 2009 (out of total of 22 librarians; 86% return rate). (The greater numbers of librarians than towns is due to one of the participating cities having multiple branch libraries involved in MotS, and our interest in obtaining data from the range of librarians and libraries participating from that city.)

For our comparison group, we contacted the director of a regional library system in Massachusetts that was not formally participating in MotS. A total of 47 librarians...
responded (out of 97, 48% return rate); the final culled sample (eliminating partially completed surveys, and assuring that each library only had one single librarian respondent) consisted of 41 children’s librarians, from 41 different towns. We also worked with the regional director of one of the current MotS systems in Massachusetts, and sought out responses from libraries not participating in the project. A total of 8 libraries/towns responded (out of 33; 24% return rate); one survey was only partially complete, leaving a total of 7 surveys in the sample. Thus, a total of 48 surveys (48 librarians, 48 cities/towns) constituted our Massachusetts comparison group (MACG).

Sample and Method for Post-program Surveys and Spring Data: To gauge the project’s initial impact on promoting mathematics in libraries, a post-program survey was administered in spring 2009 to 29 librarians who have been participating in the MotS project this past year. Twenty three librarians, representing 22 different libraries in Massachusetts, Connecticut and New York, responded to the post-program survey (79% return rate) These libraries represented the project’s engaged and focal sites that experienced either regular contact (engaged sites) or extensive contact (focal sites) with MotS project staff. Twenty of the 23 librarians fully completed their surveys, and comprise our post-program survey sample.

Spring data was also formally collected during the April 2009 librarian project meeting, which 16 librarians (representing 13 libraries) attended. During this spring meeting, librarians filled out a MotS project evaluation form requesting librarians describe what new ideas, feelings, and skills they experienced through the meeting. TERC also administered a similar form during their fall/winter 2008 meetings, completed by 25 librarians (representing 22 libraries), affording the possibility of comparing baseline to spring survey responses for a number of the librarians.

During the April 2009 meeting, the librarians also completed a written evaluation form administered by the evaluation team (Char Associates), and engaged in a small group discussion in which they described the MotS activities that the felt best: a) engaged children’s mathematical learning; b) advanced their own mathematical thinking, and c) fit with their library programming.

Thus, our final spring data sample consisted of a total of 28 librarians (23 post-program survey respondents, 11 of whom also participated in the April meeting, plus five additional librarians who provided spring data primarily through the April meeting forms and discussions.)

On their post-program survey, the librarians reported that they were involved in the MotS project for an average of 9.6 months (range 3.6 months – 16.6 months), with the length of participation fairly evenly dispersed over the 16-month period.
BACKGROUND PROFILE OF LIBRARIANS

Profile of MotS Librarians:
Type of Library: Almost half the MotS respondents (48%) worked at the sole public library for their city/town. Slightly over half (52%) had two or more libraries in their town, and worked either at the main branch (26%) or one of the smaller branches (26%).

Librarian’s Role: Roughly a third (30%) of the MotS librarians were the sole children’s librarian in their library. Of the other two-thirds, 17% were the head children’s librarian, 39% were one of several children’s librarians, and 13% held some other position (e.g., youth services manager; coordinator of children’s services).

Years of Experience: About two fifths (41%) of the MotS librarians were relatively new to their positions, with five or fewer years as a children’s librarian (18% having only 1 or 2 years in that position). A little over a quarter (27%) had between 6-10 years of experience as a children’s librarian. The remaining librarians (31%) had 11 or more years on the job (18% with 11-15 years; 4% with 16-20 years; and 9% with 21+ years).

Educational Training: The MotS librarians commonly had backgrounds in the library sciences, and/or in education. About three-fifths (62%) of the MotS respondents (13 librarians) had a MLS or MIS (Masters in Library Science or Information Science) degree; 3 of these librarians held a second masters degree (in such areas as education and accounting). 19% (4 librarians) did not have a MLS, but a masters degree in another area (3 in early childhood education; one in education). 19% (4 librarians) had either a bachelors or associates degree as their highest degree, in such areas as fine arts, general studies, and human development and family studies.
Profile of MA Comparison Group:

**Type of Library:** The Massachusetts comparison group (MACG) librarians were drawn from a region with few urban centers, and consequently included a high proportion of libraries that were the sole public library in the town (88% of MACG respondents). Of the remaining 12% with two or more libraries in their town, 8% worked at the main branch, while 4% worked at a small library in their “village.”

**Librarian’s Role:** Over half (62%) of the MACG librarians indicated that they were the sole children’s librarian in their library, while about a third (31%) reported that they were either the head children’s librarian, or one of several children’s librarians at their library.

**Years of Experience:** Compared with the MotS librarians, the MACG librarians as a group were somewhat more experienced as children’s librarians, with almost half (49%) having 11 or more years on the job (17% with 11-15 years; 12% with 16-20 years; and 19% with 21 or more years.), and almost a quarter (22%) having between 6-10 years of experience. A little less than a third (29%) of the MACG librarians were relatively new to their positions, with five or fewer years as a children’s librarian (10% having only one or two years in that position).

**Educational Training:** About half (51%) of the MACG survey respondents (21 librarians) had a MLS degree., while an additional five librarians (12%) were either pursuing a masters in library sciences, or had received either a bachelors, associates, or certificate in this area. 7% (3 librarians) had earned a masters in education. 24% (10 librarians) had a bachelors as their highest degree, in such areas as English, education (some focusing on early childhood), or psychology.
EVALUATION FINDINGS

I. COMMON LIBRARY PRACTICE AND THE INCLUSION OF MATHEMATICS

Summary of Findings: In general, the baseline survey revealed that librarians report relatively low levels of math-related program practices and behaviors with elementary school age children in their typical library practice. Explicit presentation of mathematics tended to be limited to counting stories and songs with younger children (preschool and toddlers), with some implicit inclusion of mathematics in hands-on crafts and cooking activities.

Use of books relating to mathematics primarily focused on ones that explicitly featured math, such as counting books, with rare utilization of fiction or non-fiction with non-math themes. Summer reading programs to encourage children to read during the summer months, which constituted a major emphasis in each library’s yearly programming, often involved children keeping track of the number of books that they had read, or hours they had spent reading. Use of mathematics in crafts activities was generally implicit, and tended to be limited to counting and measurement, rather than including geometry or patterns. The vast majority of librarians’ descriptions of using mathematics pertained to numbers, numerals, counting, and measurement.

Librarians also reported low levels of math-related discussions with library colleagues. This was despite the fact that a number of librarians described how they were required to use mathematics as part of their work to track and monitor their own programming for outside agencies and grant writing.

While librarians reported low incidence of currently including mathematics in their children’s programming, many were receptive to the idea of learning more about how mathematics could play a greater role in their programming for grades K-6. Most did not feel a lack of time or staff to offer math-related programming, nor believe that the most appropriate way for libraries to support children’s mathematical learning need be limited to homework help.

Inclusion of Mathematics in Library Activities and Programs

Most librarians reported relatively low levels of math-related practices and behaviors with elementary school age children. Roughly only 1 out of 10 librarians reported that it is either “mostly true” or “almost always true” that they often incorporate math into activities with K-6 (5% MotS, 15% MACG), often create and implement library activities that include math (5% MotS, 6% MACG), or routinely point out the role of math in everyday life to children (11% MotS, 6% MACG).
Roughly 3 out of 10 said that they could readily explain to children how math is relevant to using the library (26% MotS, 44% MACG).

Only a very small proportion of librarians indicated that they frequently utilize math in their various library activities and resources. Few librarians reported utilizing math “frequently” or “almost all the time” for: family programs (0% MotS, 2% MACG); handouts/take home sheets (11% MotS, 4% MACG); book displays (11% MotS, 6% MACG), and posters or bulletin boards (0% MotS, 0% MACG).

The main exceptions to rarely including math in the library were for story times and crafts activities. For story times, over two-thirds (73% MotS, 61% MACG) indicated that
they feature math at least occasionally in their programs for K-6 children. This figure is likely an overestimation, since when describing their math-related offerings for story times, librarians often portrayed their work with younger children (preschoolers and toddlers), and using counting books, finger play, counting songs, and flannel boards for telling stories.

Many of my story time books and songs incorporate counting, such as “This Old Man,” “Over in the Meadow,” “5 Little Pumpkins,” etc. We count things on the pages of the stories. We take turns and use words like “first, second, third” etc.

We have a separate section for counting books for younger children, and that is a popular story time theme for young families. We use counting nursery rhymes, counting fingerplays/flannelboards/songs like This Old Man, Over in the Meadow, Roll Over, etc., or fun interactive stories like Very Hungry Caterpillar, Roar, or The Doorbell Rang. I especially like using stories that are short and simple but encompass so much, like Ten Seeds by Ruth Brown.

In story time, we do a lot of counting in our stories, especially if the titles are considered counting stories. We also count the number of children in the program. Counting, subtraction, addition when reading a story.

Regarding librarians’ use of books to feature mathematics in library activities, roughly 1 out of 3 librarians (39% MotS, 31% MACG) reported that it was “mostly true” that they often included books with math themes in story times, displays and programs. As noted above, this figure is likely an inflated estimate for the K-6 age group, in that many librarians described their use of number and counting books and songs including younger children.

While librarians mentioned presenting counting books in story hours, featuring books with less explicit mathematical themes was fairly uncommon for librarians. For books that less overtly featured mathematics, only roughly 1 out of 10 librarians reported that it was “mostly true” or “almost always true” that they frequently used either fiction books (5% MotS, 10% MACG), or non fiction books (16% MotS, 4% MACG) that do not have math themes as a basis for math activities and discussions. Only a few librarians described having book displays that featured non-fiction math-related books.
Librarians’ primary emphasis on books extended into additional activities beyond story time. A major focus of summer reading programs is encouraging children to read books during non-school months, including encouraging children to keep individual reading logs, participate in reading contests, and engage with displays. Librarians did indicate that children used math when reporting how many books, or how many hours, they were reading during the summer months.

Some librarians also described having book displays and book lists featuring math-related books (e.g., “Display of fun math books like brain teasers and math stories like ‘Sir Cumference’”).

Other than story time, the next activity for which librarians were more likely to include math was crafts, with close to half (53% MotS, 39% MACG) indicating that they at least occasionally feature math in crafts activities. Hands-on crafts activities, as well as cooking activities, were described as primarily involving counting and measuring. Some librarians also mentioned how crafts related to geometry, sorting, and patterns.

*The craft activities sometimes include sorting, patterns and counting.*

*We do a lot of no bake cooking and that involves measuring, although we never intended it to be a math program, it was!*  

*Crafts using geometry.*  

*Geometric shapes used to create boat, train or new design.*

Several librarians expressed how the inclusion of mathematics in their work with children is often times more implicit, rather than explicit.
Math is implicit in everything we do. Whether measuring or counting or adding or sizing things up (posters and displays).

We sometimes do cooking programs, which are fun, and do include some math, but I probably don’t highlight the math concepts enough.

Librarians’ mention of using math-related games and puzzles with children was relatively rare. Among those formats that were mentioned included an estimation jar, a number sequence “connect the dots” sheet, and a scavenger hunt with numbers.

*Estimate number of “things” in a jar for each holiday (candy corn, MM’s, Candy hearts, etc.).*

*Dot to dot sheets (number sequence/order at low level).*

*We have done scavenger hunts in the library. Pictures are hidden throughout the library and the number clues must be added or subtracted to get to the mystery number.*

A small number of librarians described not one, but multiple types of library activities they do that incorporate mathematics, with much of the focus appearing to be primarily on counting and measuring.

*Displays of non-fiction math books, themed story times/crafts with math as part of the theme (i.e., counting, measuring).*

*Counting stories, new book displays, coloring sheets with simple math, crafts involving counting out items.*

*Use of stories or songs with math contained in them; use of mathematical principles to construct crafts; math/science themed book displays; occasional math element to family enrichment programs.*

*We have set up fiction math book displays, focused on measurement during our Chinese “wok” cooking class. I hang items from the ceiling for 100+ for all holiday themes and it always involves counting and color sorting: Example: “How many BLACK valentine hearts are hanging from the ceiling and on display?“*

One librarian was unusual in her description of a more extensive and more complex set of mathematics activities offered through her library:

*We offer an elaborate, hands-on set of activities at the CT Science Expo each year, and it always includes math activities. Examples: comparing chocolate content of candies, tiling patterns, calculating carbon footprint, codes. We also give homework assistance in math every school day.*
Similar to librarians’ fairly infrequent incorporation of mathematics in their interactions with children, librarians also reported low levels of math discussion with colleagues. Only roughly 1 out of 10 librarians reported regularly discussing the role of math in every day and library use with colleagues (11% MotS, 6% MACG), sharing ideas on using math in story times, displays and programs with other children’s librarians (5% MotS, 4% MACG), or being able to explain to colleagues ways math for K-6 supported the library’s mission (5% MotS, 19% MACG).

![Librarians' Discussion of Mathematics with Colleagues](image)

At the same time, several librarians described how they were required to use mathematics as part of their work to track and monitor their own programming for outside agencies and grant writing.

*I collect and report the Youth Services statistics, and do statistical work for other departments, as I have some expertise in that area. I also do budget work, census data analysis for grants, and survey design, implementation and analysis. Consequently, I discuss math-related questions with my colleagues frequently.*

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*Librarians’ views on the role of mathematics in the library*

Librarians from the 48 towns in our comparison group also responded to a set of survey items concerning their current practices in, and attitudes towards, mathematics. Their responses indicated a current low level of children’s programming that incorporates mathematics, but also an openness to expanding their use of mathematics.

Almost none of the librarians (2%) indicated that they do a great deal of math-related programming for grades K-6. Only a fourth (25%) felt that “including more math in our programs for grades K-6 is a strong priority.” Similarly, most agreed (66%) that “literacy, social studies, and the arts are a better fit with our programs than math.”
At the same time, librarians appeared receptive to the notion of offering more mathematics in their library programming. About 3 out of 4 librarians (77%) expressed that they would be interested in attending a two-hour workshop on how to make math a greater part of their programming for grades K-6.

I enjoy offering a variety of programs. Math-related programs would be a nice addition to what I already offer!

Fun math-related performers would be interesting.

For the past 20 months our main facility has been closed for construction, and the library has been functioning in two very small, inadequate buildings that have essentially no room for programs. That said, we have included math titles in the new book display area as they arrive. We did a beading program last summer that involved some math in creating the designs. I have done math-based programs in past years and it is certainly something that I would do again.

Whereas time and staffing levels are often cited as common constraints on program offerings, less than half (44%) felt that they had no time or staff to offer math-related programming. Even though homework help is generally the most typical way in which mathematics is supported in libraries, only about a quarter (28%) felt that homework help and test preparation seemed the most appropriate way for libraries to support mathematics learning.

A few of the librarians candidly expressed how their own discomfort with mathematics, coupled with libraries’ predominant emphasis on programming for young children, had hindered their ability to encourage mathematics learning in their current program practices for K-6.

Math was never a favorite topic of mine as a child, and perhaps it therefore is not natural for me to think of activities related to math. I tend to focus on the humanities,
and enjoy doing crafts. We don’t get a lot of older elementary-aged children for programs here, just up through about third grade. The town has a very large population of young families and they take up most of our programming.

As a one-person shop, I need to plan our programs carefully so as to address the needs of all ages without becoming overwhelmed. I try to be creative, though, and I must confess, because I am somewhat math averse myself, I recognize that a workshop could be helpful to me in incorporating these themes into story times and other programs.
II. THE INCORPORATION OF MATHEMATICS IN MotS LIBRARIANS’ PROGRAMS AND PRACTICES

Summary of Findings: Librarians reported a clear increase in regularity with which they engaged a range of mathematics-related behaviors in their interaction with children and colleagues. There was a sharp increase in the frequency with which MotS librarians featured mathematics in certain types of library offerings especially story hours and interactive posters, and more than half the librarians indicated that they at least occasionally featured math in crafts, handouts, book displays, and in family programs.

Librarians indicated that they now could readily explain to children how math is relevant to using the library and routinely pointed out role of math in everyday life to children. Changes in their interactions with children also extended beyond specific MotS programs, with most reporting changes in the way they generally lead craft activities and story times, and how they ask children questions. Close to half indicated that they had designed and used some of their own original activities based on MotS.

Almost all the librarians indicated that their thinking about the role of math in library activities for grades K-6 had changed through their participation in MotS. Librarians described a wide range of changes, including broader notions of mathematics and its connections to daily life, a heightened awareness of mathematical opportunities in their libraries, and increased efforts and intentionality in incorporating mathematics in their library programs and routines. MotS librarians were highly positive about the role of mathematics in the library, and reported a sharp increase with which they could explain to colleagues ways mathematics for K-6 supported their library’s mission.

Most librarians indicated that they felt at least somewhat successful in using MotS materials to promote elementary school children’s learning and enjoyment of mathematics, and that they found it easier to implement MotS than they did six months ago. Regarding factors optimizing their success of MotS implementation, the vast majority of librarians specifically cited the importance of the range of MotS activity formats, the quality of the MotS materials, and access to the MotS website. Having insufficient time to plan MotS activities was by far the single largest factor seen as hindering implementation.

Librarians were especially appreciative of the MotS activities that were quick and easy to implement on a regular and re-occurring basis, and allowed children and families to work fairly independently on their own, using interactive posters and bulletin boards, or free-standing games and activities. In-person librarian meetings and technical support offered by the TERC project staff were also regarded as important by over half the librarians, as was the importance of support from colleagues and supervisors in their host libraries.

As noted earlier in the report, MotS librarians filled out electronic baseline surveys during the fall and winter of Year 2 (October 2008 or February 2009, depending on their start-date of joining the project), and in the spring completed an electronic post-program survey (May 2009). Thus, anywhere between three to seven months elapsed between the
administration of the two pre- and post-program surveys. During this time, MotS librarians were requested to use MotS materials at least once a month. On their post-program survey, the librarians reported that they were involved in the MotS project for an average of 9.6 months (range 3.6 months – 16.6 months.), with the length of participation fairly evenly dispersed over the 16-month period.

In the pre-program survey, librarians were asked to describe the one-year period preceding their first contact with the MotS project. In the post-program survey, librarians were asked to describe the three-month period leading up to the current post-program survey. Together, data from the pre- and post-program surveys were designed to assess the changes in library programs and practices promoting children’s mathematics learning resulting from the MotS project, as well as the rewards and challenges of the program’s implementation.

Results are organized in four sections, pertaining to: 1) inclusion of mathematics in library programs and resources; 2) librarians’ math-related behaviors; 3) librarians’ attitudes towards the role of mathematics in libraries; and 4) librarians’ self-assessment of success of MotS program implementation.

Inclusion of math in library programs and resources

There was a clear increase in the frequency with which MotS librarians featured mathematics in certain types of library programs, specifically story hours and through interactive posters. Through participation in MotS, about a third of the librarians indicated that they frequently featured mathematics in story hours (5% pre vs. 36% post), and through interactive posters (0% pre vs. 32% post), compared to very few reporting doing so in the baseline surveys.

At least half the librarians indicated that they at least occasionally featured math in crafts (39% pre vs. 69% post), handouts (39% pre vs. 63% post), book displays (43% pre vs. 54% post), and in family programs (26% pre vs. 50% post).
Roughly half (45%, 9 librarians) indicated they had included MotS in a family program. Of those that offered MotS family programs, about half (56%, 5 librarians) offered a whole-group session focused on one or two MotS activities, while slightly less than half (44%; 4 librarians) used a station-based set up in which families circulated among various MotS activities. No librarians opted to simply offer a whole-group session in which they slipped in a short MotS activity.

Librarians describe a wide variety of ways to incorporate MotS activities, sometimes around a central theme (e.g., poetry, food), and sometimes a rich potpourri of mathematics activities across different activity stations. A number of librarians spoke about the positive response they received from parents, with some parents requesting additional math events or materials to take home.

We did one session of a weekly Family Poetry Program. There were 10 children, 3 parents, and two librarians. The parents who were present enjoyed the three activities: Quick Question: What Month Were You Born In?, Say it With Shapes, and Name Game. The parents were a bit confused about how the “pattern poetry” was math. We talked about patterns and sequencing and shape recognition and they seemed satisfied. They really liked the name game which was the last thing we did and by then they seemed to be able to get what was “math” about it. It was also good because we had game boards in Spanish, and one of the moms spoke no English. The parents wanted to take home copies of the name game to do at home.

In the past 3 months, I’ve done “Piece it Together” twice, “Giant Museum” once and “Look Around” once. Each time, the parents/caregivers joined in the activity. Each activity averaged about 6 children, plus 4-6 adults. The feedback from adults was positive and enthusiastic.

We did a number of activities dealing with food – pour some, serving size, double or more, how many in a minute, and read the label. We had 12 children plus 12 adults. We went from station to station as a group. Parents loved it. They appreciate any library activity that has substance – not just a craft for craft’s sake.

We had about 10 parents and children. We had stations around the room including: graphing, sorting, 6 square, animal posters, How Long, tangrams, a book display, mystery jars, and Size them Up. The parents who attended enjoyed the program. They asked me to do another one, which I did during school vacation.

Only a fifth (20%; 4 librarians) indicated that they had offered MotS-based programs for elementary school aged children to after school groups in the past 3 months. Two librarians reported utilizing three different outreach strategies, while two described using one form of outreach. The outreach activities typically involved inviting after-school groups to participate in activities held in the library. Two librarians indicated that the
participation involved either an invitation to join an already scheduled program, or to come to a public program, while one indicated that the program involved a library tour.

Given the time demands of offering programs to one’s library patrons, only two librarians indicated that their outreach involved a visit to the community group’s facility to provide an activity. One librarian also offered a one-time special program at the library designed specifically for the visiting after-school group.

One librarian spoke about the advantages of partnering with a community organization to reach the target age group, as well the challenges in doing such outreach.

*Unfortunately, getting the correct age group [of K-6] into our library to do MotS activities is extremely difficult during the school year. These kids have so much going on after school already (and have parents who are at work) that coming to an after school program at the library is not a top priority. We have been most successful in implementing the activities during our outreach sessions at other agencies. We do our best with that, but due to time limitations and staffing shortages, we aren't able to get out of the library as often as we'd like.*

**Librarians’ Math-related Behaviors**

Librarians reported an increase in regularity with which they engaged a range of mathematics-related behaviors in their interaction with children and colleagues. About half the librarians indicated that it was “mostly” or “almost always” true that they often incorporated math into activities they lead with K-6 children (5% pre vs. 50% post) and often created and implemented library activities that include math (5% pre vs. 55% post).

Librarians also indicated that they could readily explain to children how math is relevant to using the library (26% pre vs. 70% post) and now routinely pointed out the role of math in everyday life to children (11% pre vs. 45% post). More modest gains were reported in their frequency of using fiction books that do not have math themes as a basis for math activities and discussions (5% pre vs. 20% post).

No gains were observed in librarians’ reporting that they often included children’s books with math themes in story times, displays and programs (37% pre vs. 30% post) nor in frequently using non-fiction books that do not have math themes as basis for math activities & discussions (16% vs. 10%).
In their post-program spring surveys, librarians also reported changes in the way they interacted with children that extended beyond the specific MotS programs they conducted. At least half the librarians reported either “some” or “a lot of” change in the way they lead craft activities (74%), how they ask children questions (68%), and the way they lead story times (53%). Close to half (45%) indicated that they had designed and used some of their own activities that were based on, or similar to those, in MotS. A third or more indicated “some” or “a lot of” change in the types of books they chose to feature in story times (42%) and how they talked with children about books (32%), while about a quarter changed how they showed children around the library (26%).

Regarding their interactions with librarian colleagues, the librarians reported a sharp increase with which they could explain to colleagues ways mathematics for K-6 supported their library’s mission (5% pre vs. 50% post). Slight increases were reported for their regularly discussing with colleagues the role of math in everyday life and library use (11% pre vs. 25% post), or sharing ideas on using math in story times, displays and programs (5% pre vs. 20% post).
Librarians’ understanding and views of the role of mathematics in the library

Almost all (90%, 18 librarians) of the librarians indicated that their thinking about the role of math in library activities for grades K-6 had changed through their participation in MotS.

Librarians described a wide range of changes, including broader notions of mathematics and its connections to daily life.

Before, I thought children can only learn math from school, from their textbook. Now I know there are so many things in our daily life involving math.

Well, first, I never would have thought of blending math into library activities, and second, my understanding of learning math from a kid's perspective has changed. I used to think math had to be obvious, but I've seen that, applied to real life situations, it can be fun and natural.

Some spoke of a heightened awareness of mathematical opportunities in their library programs and practices, while others described their increased efforts and intentionality in incorporating mathematics in their programs and routines.

Math can be incorporated in more ways than was immediately apparent--that is, there's more to math in libraries than just having children count objects on pages in picture books and doing counting fingerplays, for example.

We now use all chances to count, etc., as a way to think math, when we do our activities. There are a lot of times when this can occur during programs, or even at checkout.
I guess I never thought about it before even though I really like math. The more broadly I think of the Library’s role and mission in the community, the easier it is to incorporate lots of new and exciting ideas and programs into what we already have. I have always tried to use math in the library but I am now much more conscious about adding in math whenever possible and for all age children.

I now think more in terms of ideas and what great math they would be. For example, next year we are discussing making passports & suitcases for the kids and planning a unit on travel. I already have said a few times what great math we could work into this. I might have concentrated more on the country's culture or literature before and not considered math.

MotS librarians were highly positive about the role of mathematics in the library, and how MotS fit into their library practices and mission. The vast majority of librarians indicated that including more math in their programs for grades K-6 grades is a strong priority (90%), and did not feel that literacy, social studies and the arts were a better fit with their programs than math (65%). They did not feel that they had no time or staff to offer math-related programming (90%), nor that homework help or test prep was the most appropriate way for libraries to support mathematics learning (85%). 85% expressed continued interest in attending a 2-hour workshop on how to make math a greater part of their programming for grades K-6.

Librarians during the spring project meeting were asked to describe a MotS activity that helped most advance their understanding about what math could be like for children, to help elucidate both the shifts in librarians’ mathematical thinking and highlight particularly promising MotS activities and what features might have made them so.

Three librarians expressed their “a ha” moments as follows:

_The How Many in a Minute? activity showed me that there can be so much math in the simplest of activities. You can think about most things through a mathematical lens._

_In Doubling, the kids had to figure out how to double even though most knew nothing about fractions. (e.g., how do you double a ¼ cup?) It was easier for them to work with a concrete amount they could see in front of them. The relationship between volume and weight was fascinating for them (cups of salad are about weightless, a tablespoon of nuts is heavy). As adults we take all of this type of knowledge for granted – it seems instinctive but isn’t really. You need the experience of seeing and holding to understand._

_The Look Around activity used a lot of basic math concepts that I usually wouldn’t have even thought about – simple counting, looking for shapes. Simply that can be fun [for kids]. Many scavenger hunt activities would incorporate math even without trying to do so. Just planning and reading through how to do this activity made me realize that I had been thinking in too complicated terms when thinking about the concept of “math.”_
Librarians’ Self-Assessment of Success of Implementation

83% of the librarians indicated that they felt at least somewhat successful in using MotS materials to promote elementary school children’s learning and enjoyment of mathematics. 80% of the librarians reported that they found it easier to implement MotS than they did six months ago.

When asked to describe the activity that they had seen as most successful in promoting children’s mathematical learning, the 18 librarian respondents collectively named 11 different activities, a testimony to both the broad appeal and variety of the MotS activities, as well as the highly individual preferences of the librarians.

Building Bridges I think was the most successful...The children problem solved, measured, predicted, experimented and revised plans as needed. It was very hands-on and the children didn’t even want to leave when the session was over.

I would say Quick Questions, because the kids like to talk about them a lot... I did “How Many Letters in your First Name?” The children really like putting up their answers and scouring the chart to make comparisons with themselves and others first. Then they go on to looking for the most common data, which they express as “winning”. For example, “6 is winning because most people have 6 letters in their first name so 6 is the tallest.” Each child seemed interested in making lots of comments about the graphs.

So Long. The children used library resources to research ocean animals. Each team selected an animal, wrote three clues to its identity and then measured the yarn that would give the clue to the animal’s size. One child chose a killer whale and she actually marked with a marker each foot of yarn as she measured it with a ruler. Another team chose a sea horse and their yarn was only three inches. They were very precise in measuring. The jellyfish team had a range of sizes to choose from, and chose one that would be long enough to hang off the bulletin board. They reasoned, measured, counted, estimated, added, and compared sizes. The children say, “I love So Long!”

Giant Museum. We have used this activity twice: once as an after school activity and once as part of a family night. The children seemed to really enjoy this activity using their creativity, while trying to be as precise as they could be.

Almost half (45% (9)) of the librarians indicated that they had designed and used some of their own activities that were based on, or similar to those in MotS. A number of the librarians used activities such as mystery jars, or Quick Questions, and slightly varied the activity, modifying it to feature different kinds of objects or questions. Two librarians described more extensive new activities, focused on numerical concepts and measurement.
While doing a unit on the Iditarod, I used some math activities. The children had to estimate and then add up the mileage of the actual Iditarod. We then decided to collect 1161 (actual mileage) items. We used cereal. They were given containers of Trix cereal. They had to count their cereal and add it all together to make 1161. Some children counted by 1's, 2's and saved groups of 10 or 20. Each group used a piece of paper with slash marks to tabulate their totals. We estimated our totals and then what they would be all added up. We had to count out cereal three times to make 1161. Children used skills like estimating, counting, reasoning, adding, and multiplying. They were allowed to eat the cereal afterwards making it a favorite activity.

We did a Mixing and Measuring Family story time that 75 people attended....We read two stories, demonstrated using measuring tools (tape measure to measure plants we'd made out of paper and felt, measuring cups to measure soil and water, rulers, and measuring spoons) and then each child got to choose one type of seed to plant (based on how big the plant would grow from our visual models). They each measured out dirt, peat moss, then marked out planting depth with a ruler, and then added two tablespoons of water. We planted our own for the library, and then I did the activity for preschoolers in a small story/craft program and they got to measure the actual plants as well.

Factors the facilitated or hindered successful implementation
When presented with a list of possible factors that might optimize their success of MotS implementation, almost all of the librarians cited various aspects of the MotS materials themselves as either important or very important. Librarians specifically cited the importance of the range of MotS activity formats (95%), the quality of the MotS materials (85%), and access to the MotS website (85%).

In-person librarian meetings (58%) and technical support (55%) offered by the TERC project staff were also regarded as important, but less critical. Librarians also reported the importance of support from their host libraries, either from fellow library staff (63%) or their library administrator (60%).
Two librarians expressed the importance of support from fellow librarians and colleagues as critical to program success:

In order to make MotS more successful at our library, I really think having time to exchange ideas with other librarians is key.

I think that the most important issue is "buy in" from staff and administration. Programs really can't feel like "add-ons," but must be organic.

Regarding factors that hindered successful implementation, librarians reported that having sufficient time to plan MotS activities was by far the single largest factor hindering implementation (80%). About a third also indicated they wished they had a greater comfort level with mathematics (35%) or more MotS training (30%). A fourth mentioned aspects of their library mission (25%) or general outreach (25%), while a fifth (20%) cited their own interest level in mathematics.

In general, librarians were quite positive about the features of MotS activities and materials, with only a relatively small proportion of librarians feeling that the activities entailed a level of hands-on materials (20%), space (10%), or noise (10%) that might have hindered their use in the library.
Given constraints of time and limited staffing, a number of librarians were highly positive about the MotS activities that allowed children to work with them fairly independently.

*Staffing and time are sometimes in conflict with our small branch, so I find I can’t always offer MotS activities. However, the animal fact posters last summer were EXTREMELY popular and I’ve had a few patrons (kids & adults) ask if we’ll be doing a similar project this summer!*

*I wish I had more time to spend planning programs. I will incorporate the space posters into the summer reading program.*

*[I’d like] even more activities that fit the randomness of library visits…[rather than activities that] require regular meetings for the same group. We made booklists, and used the posters, and monthly calendars, which worked perfectly.*

Librarians during the spring project meeting were asked to describe a MotS activity that they regarded as the easiest to fit in with their library program, to help elucidate key characteristics of their library/program that guide their use of activities, and what features of the activity made it fit well.

The 15 librarians cited nine different activities, a testimony to the ease of use of the materials. When citing attributes of activities that guided “ease of fit,” librarians typically cited activities that made them quick, easy to implement (e.g., requiring
minimal materials, could be used independently by children, and flexible to adapt to various themes.)

**How Many in Minute.** I like how easy and quick this activity is. Many of the others we’ve done are their own program that we especially plan. This was easy to tag onto the beginning of a program we were already doing. We always like to have something to “get the wiggles out” at the beginning. This works well as that activity.

**Quick Questions.** I look for uncomplicated tasks that can fit into a program to extend a theme the program is based around. One staff member does the program so it needs to be simple. Recording complicated end results are hard in a big group. A poll of the attendees is easy to do with a poster/easel set up. Dots, markers, etc. can be used to make simple bar graphs.

Others named activities that were easily accessible to many patrons, and available during repeat visits, primarily due to placement in a prominent space in the library and being independent and “self-running,” not requiring a special program to administer. Examples of these activities mentioned were a mathematical Quick Question, or Question of the Week graphing activity posted on a bulletin board (the most commonly mentioned activity, cited by 6 of the 15 librarians), interactive posters, and Mystery estimation jars.

Physical location of the activity was key – either being a bulletin board prominently displayed in the children’s room, or located near the circulation desk where children’s librarians sometimes needed to be stationed, but from which they could still supervise and oversee the activity. The adaptability of the activity format was also important (i.e., flexibly changed and altered to fit various library themes or community topics), so as to provide a regularly re-occurring mathematical activity at the library. Patron engagement also seemed to be heightened by activities that patrons viewed as especially fun, and that were contests.

**Quick Questions.** It doesn’t need a structured group. Children visit my library as a family and can do it without a structured activity. The children can do it on their own or in informal gatherings and it can be spread out over time.

**The animal facts poster.** We are short staffed so something less intensive, self-directed, etc. is good. We want fun programs as well to clearly separate ourselves from teaching/education. This activity also substituted really well for a trivia question activity that was already well-established and eagerly anticipated by children of our community (prizes are involved).

**The estimating jars were hugely popular.** The jars were easy, always available, and were fun because 1) it was a mystery, and 2) it was a contest. Kids and parents really looked forward to them.

**Quick question of the week.** The bulletin board in the entrance to the children’s room works well to fit a poster graph that children can record their answer as they enter.
Quick and easy, and the kids just loved it every time. Good visual on the large poster graph, and I let kids mark their own on clipboards and take home.

Other librarians spoke about activities that could be easily adapted to different themes emphasized in the library, or common activity formats, such as story hours and crafts. Two of the librarians spoke about activities (e.g., So Long, Piece it Together) that connected with using non-fiction library sources and mystery genres, while another liked construction activities that she used in place of a crafts activity.

The giant/height museum. We used these activities in place of “craft time.” It worked well because kids still got to use their imagination while still creating something. Using stickers, markers, crayons, and stamps helped make the transition from “craft time” to the MotS activity.

A few of the librarians, primarily those in New York, described activities that addressed the multi-cultural and multi-lingual nature of the communities they served.

Pretend Picnic. As a circle activity, it involved kids’ imaginations and lends itself to our multicultural census (kids sometimes had to explain their foods.)

Quick Questions. It’s easy and quick to do, and to translate into other languages. Can put near the children’s desk, and be answered by people of all ages. The librarian can easily discuss this with kids.
III. BACKGROUND ON LIBRARY STAFFING, DEMAND, PROGRAMS AND AUDIENCES

**Summary of Findings:** A major objective of the baseline survey was to gather background information on public libraries and add to the knowledge base on public libraries as potential informal learning settings for children and families.

Libraries come in “many shapes and sizes,” and offer tremendous opportunities to reach highly diverse audiences. Within a single regional library system, or even within a single city or town, libraries range from very large to very small, and from urban to rural. Libraries typically serve patrons of a wide range of ages and, in most communities, serve many families who may be economically struggling and from a wide variety of ethnic, cultural and linguistic backgrounds.

We learned that our participating libraries are highly varied in their staffing levels for children’s services, ranging from only one staff member to fourteen. Over half of our respondents were the sole children’s librarian in their library. The average children’s library staff consisted of about 4-5 individuals, including one or two professional librarians, a few non-professional staff or adult volunteers, and a few teen helpers.

Libraries also ranged in the level of attendance by children, although roughly half had at least 20 children during the afternoons after school, with numbers dramatically increasing for some libraries over the summer. Staff often struggled with the demands of handling the circulation desk, which detracted from the time and energy needed to offer programming.

Libraries typically offered a variety of different activities for elementary school-aged children, including special family programs, regular monthly and weekly programs, homework assistance, and summer reading programs. The number of regular weekly programs varied widely by library, ranging from none to ten, and averaging 2-3 weekly programs during the school year, and 3-4 during the summer. Internet access was readily available to children in all libraries.

Offering multi-week (3- to 6- week) programs for which children’s attendance across weeks is expected and/or encouraged was somewhat atypical. Similarly, while most libraries reported offering some type of program to community-based groups, these offerings were typically sporadic, and consisted of a single special session or visit, rather than a sequence of program offerings, or based on an on-going relationship between the two organizations.

Librarians were accustomed to handling multi-age groups, typically doing so by their own adaptation of activities. About a third or more of the librarians also reported using older elementary school children in the group or teens as helpers. Some librarians seemed to make a distinction between the K-3 age group and children in upper elementary school and middle school, often utilizing children in those older age groups as helpers on an ongoing basis.
In general, there was a relatively good correspondence between what librarians see as most important aspects of their job, and how they spend their time. They regard the most important aspects of their job as focused on their book collections – maintaining and offering a high quality children’s book collection, and helping children and families use the collection. The next highest priority concerned their provision of children’s programs. Relatively low priority and amounts of time were given to homework assistance, and offering support to parents. Several librarians indicated that helping patrons check out books was one of the most time-intensive aspects of their job, although none viewed it as one of the most important parts of their job.

Libraries offered tremendous opportunities to reach highly diverse audiences. Many librarians described the wide ethnic diversity of their communities, as well as the special challenges posed by multi-lingual audiences and immigrant families.

In addition to the significant challenges in serving their diverse local communities well, librarians mentioned how the downturn in the economy has significantly affected their library budgets, staffing, programming and ability to serve their communities. In their post-program surveys, 90% of the librarians indicated that they had observed changes in their library, which they attribute to the tighter economic climate, and which is in stark juxtaposition to the optimism described in baseline surveys around available staff time and resources.

**Staffing for children’s services/programs**

As noted earlier, roughly a third (30%) of the MotS librarians were the sole children’s librarian in their library. Of the other two-thirds, 17% were the head children’s librarian, 39% were one of several children’s librarians, and 13% held some other position (e.g., youth services manager, coordinator of children’s services, or “the teacher” in the library who help children with homework and school projects during after school hours).

For the MACG librarians, over half (62%) indicated that they were the sole children’s librarian in their library, while about a third (31%) reported that they were either the head children’s librarian, or one of several children’s librarians at their library. A few respondents who worked in the smaller libraries indicated that while they were responsible for delivering children’s programs, they also held the position as library director or had other responsibilities for adult services as well.

There was high variability across libraries regarding how many staff are available to deliver children’s programs and services (total staffing ranging from 1-14). The majority of libraries (64% MotS, 73% MACG) reported having 6 or fewer total staff dedicated to staffing children’s services, with an average of 4-5 staff (5.5 MotS, 4.1 MACG).
The “average” children’s library staff consisted of roughly 1-2 professional librarians (1.9 MotS, 1.3 MACG), 1-2 non professional staff (1.6 MotS, 1.9 MACG), 1 or no adult volunteers (0.3 MotS, 1 MACG), and 2 teens (1.7 MotS, 1.8 MACG).

My library has 6 full-time employees. I am the director as well as in charge of all children’s services. My main focus is on preschool and toddlers. I realize that K-6 grade level is missing out on library activities. We are not allowed to have volunteers and the Union job descriptions are very strict. All staff members assist students with homework and reference help.

Priorities of job versus allocation of time

In the post-program spring survey, MotS librarians were asked for their views on what they regarded as the most important aspects of their job, as well as how they spend their time. In general, there was a relatively good correspondence between what librarians see as most important aspects of their job, and how they spend their time. The most important aspect of their job is focused on attention to their book collection – maintaining and offering a high quality children’s book collection to patrons (89%), and offering support in helping children and families use the book and media collection (68%). The next highest priority concerned their provision of children’s programs, either offering programs for elementary school-aged children (74%) or preschoolers and toddlers (63%).

Regarding their expenditure of work time, librarians reported spending the most time on attending to the quality of their book collection (89%), followed by their time devoted to offering programs to preschoolers (74%) and elementary school children (63%). Their assessments indicated that they devoted slightly more time to preschool and toddler programs than they deemed as high priority in importance, while the converse was true with elementary school children (they deemed such programs as high in importance, but saw it as taking a less time-intensive part of their job).
Relatively low priority was given to homework assistance, both regarding importance and in dedicating time. A small number of librarians indicated that helping patrons check out book was one of their top three most time-intensive aspects of their job, in contrast to none rating it highly in terms of the most important part of their job. Offering support to parents was rated both low in terms of high priority and time.

![Children's Librarians' Estimations of Their Responsibilities](image)

**Typical library attendance patterns by K-6 children**

Across and within the various libraries, there was a large range in the number of K-6 children frequenting libraries. During the afternoons after school, about two-fifths reported having between 11-20 children (42% MotS, 37% MACG), with most of the remaining libraries reporting between 21-50 children (53% MotS, 40% MACG). About a fifth (19%) of the MACG libraries reported 10 or fewer children in the library after school. One librarian explained how her low attendance figures were due to a variety of factors, including being in a small town and having limited hours and space.

*We are a small library, for a small town, only open 28 hours, with minimal space.*

Attendance generally dropped on Saturday mornings, while increasing during the summer. A third of the libraries (35% MotS, 35% MACG) reported 10 or fewer children on Saturday morning, with another third (29% MotS, 27% MACG) reporting 11-20 children.

In contrast, roughly a quarter (28% MotS, 19% MACG) of libraries reported 51 or more children in the summer, while many (39% MotS, 52% MACG) reported between 21 and 50 children.
As far as the children’s pattern of library attendance over the course of a year, from school year to summer, over half (56% of MACG, 53% MotS) of the libraries reported an increase in attendance over the summer, while a little over a third (38% MACG, 36% MotS) reported the same level of attendance. Only a small number (6% MACG, 12% MotS) reported a decrease in children attending during the summer months. For many of these libraries, staff struggled meeting both the demands of handling the circulation desk and the time and energies needed to offer children’s programming.

Since our population triples in the summer time, but staff levels remain the same, it is difficult for staff to handle the extra activity. Would always suggest more time off the circulation desk to do planning.

On their post-program surveys, the MotS librarians were asked whether they had a core group of elementary school-aged children who regularly come to the library. 65% (n = 13) of librarians reported having a core group of child library visitors. On average, librarians reported this core group as having about 15 children (range 6-30 children), with the youngest children being 5.5 years old (range 5-8 years) and the oldest 10.6 years old (range 5-13 years).

Commonly offered library programs and services for K-6

The most common library programs offered to elementary school children are special family events (77% MotS; 85% MACG), and regular monthly activities (77% MotS, 56% MACG). The MotS libraries also commonly offered occasional programs after school (85% MotS), only offered by half (50%) the MACG libraries.

Only about two-fifths of the libraries offered regularly weekly activities (38% MotS, 46% MACG). Homework assistance was offered by over half the MotS libraries (54%), but by about a fourth of the MACG libraries (27%).
Many librarians described how their summer reading program was a major component of their yearly programming. A number also described their work with schools, either engaging classes that came to the library for a visit, or doing outreach to schools and daycares, and conducting sessions in the schools themselves.

There was high variability across libraries of how many structured children’s programs they offered per week, ranging from 0-10 during the school year, and 1-10 during the summer. The average number of programs offered by MotS librarians was 3.6 programs during the school year (2.6 in our MACG), and 4.2 programs during the summer (3.6 in our MACG), reflecting the generally higher level of program activity offered during the summer.

Most of the librarians in the MACG indicated that prior sign-up for programs is required (67%), while the reverse was true for MotS (63% indicating that prior sign up is NOT required).

All of the libraries (100% MotS and MACG) indicated that children have regular internet access, while a few indicated that some sort of parent notification or oversight is also required in order for a child to access the Internet. While access to a computer was a highly positive draw for many children, it sometimes provided stiff competition to participation in an ongoing children’s program.

I work in a very rough generally low income area. The library is a “come and go” sort of place, so it is hard to make kids stay and participate. They also tend to gravitate towards using the computer and once they’re on, it’s hard to pull their attention away. We find that food activities are a great way to sneak in some math, as well as other activities where something is made.

Reason(s) core group comes
The MotS librarians who reported having a core group of children who visited the library (n = 12 librarians) were asked to describe the major reasons they thought these children
came to the library. As indicated in the figure below, technology and use of the computer is regarded as a major reason that children in the “core group” come to the library (100%). Other common reasons are to attend structured programs and/or take advantage of the book collection (75%), as well as to socialize with other children (67%). A little less than half come either for homework assistance (42%), or as a place to wait for either parents or siblings to come pick them up after school (42%). About a fifth of librarians (17%) also report that children come to the library to receive a snack.

Multi-week programs and programs for community-based groups
Offering multi-week (3- to 6- week) programs for which children’s attendance across weeks is expected and/or encouraged was somewhat atypical. Most MotS librarians (74%) indicated that they do not offer any programs designed as multi-week programs, while MACG was evenly split between offering and not offering such multi-week programs (50% and 50%).

Of those who offered multi-week programs, librarians typically described book clubs (e.g., Books2Movies book club), multi-week art projects (e.g., on origami, pop-up books; mask making), and chess clubs. Several librarians mentioned multi-week programs offered only during the summer, such as nature crafts activities or cooking classes.

Among the specific programs mentioned included:

Play reading (4 weeks at a time. Kids 10 and up get together and read plays, do some theater exercises).

Pop-up book workshop – 8-week program where kids create a pop-up book. Because of staffing and scheduling problems, we haven’t offered it for a couple years.
Four-week weekly science workshop, each on a different subject.

After school weekly “classes” with college students working with Grades K-3; scout library tours/scavenger hunts; home school classes and Culture Fair; Book Cook classes – combining reading and cooking items relevant to the books.

A number of the librarians seemed to use the term “club” when describing the regular program offerings for older children. This term appears to aptly capture the highly voluntary nature of the library activity, its special focus, and the encouragement of membership and regular attendance.

While over half of the libraries reported offering some type of program to community-based groups, these offerings were typically sporadic and consisting of a single special session or visit, rather than a sequence of program offerings or stemming from an ongoing partnership between the two organizations. About two-thirds of the librarians reported that they offer programs to community-based groups (58% MotS, 60% MACG). Much of what librarians described was offering library tours to Boy Scouts and Girl Scouts, and running special programs for merit badges:

Scouts tour the children’s library and participate in a pre-arranged project. [We also offer] story hours for YMCA and Headstart School groups for tours, stories and crafts.

A few librarians included amongst their weekly programs those programs offered by organizations such as 4-H (on babysitting, or a club meeting), which used the library as its program facility.

Techniques for handling multi-age groups

The most common technique for handling multi-age groups is staff adapting activities (95% MotS, 92% MACG), done by almost all the librarians. A little less than half report using older elementary school children in the group as helpers (47% MotS, 42% MACG). Roughly a third utilize teens as helpers (31% MotS, 40% MACG).
Based on comments offered by some librarians, it appears that some make a distinction between the K-3 age group and children in upper elementary school and middle school, utilizing children in those upper age groups often as helpers on an ongoing basis.

*We have a youth Library Council composed of youth in grades 4 through 8 who help with programming such as video and board game nights, and programs with population books as hooks.*

*“Junior Friends of the Library” club.*

*“Junior Friends” – grades 4 and 5 meet every other week for 1 ½ hours and do everything from making displays/bulletin boards to programs for them, or with them helping run programs for young children.*

*I like to see the older children working with the younger children in story and craft programs; both age groups benefit so much from these interactions. Last summer we had members of our Youth Library Council prepare story times with a craft, to the delight of the preK/K participants. I could envision incorporating math themes into these programs.*

Several librarians also indicated leveraging parents as helpers. It was not clear from these comments whether these parents were attending programs with younger children or were there during a family event.

*Demographics of Communities Served*

Libraries offered tremendous opportunities to reach highly diverse audiences. Initial interviews with the librarians, coupled with our baseline surveys, revealed an amazing diversity in communities, families and children that can be reached through public libraries.
Within a single region, or even within a single city or town, libraries range from very large to very small, and urban to rural. Many librarians described the wide ethnic diversity of their communities, as well as the special challenges posed by multi-lingual audiences and immigrant families.

Across the board- Black, white, Latino- American-born, many immigrants especially from Brazil, Central and South America, India, Middle East, China, Japan, Africa.

Median income is $38,457. 14% population live below the poverty line; highest for the very young and elderly. Nonwhites make up 30% of the population; largest Brazilian community outside of Boston. Also Cape Verdeans, African-Americans, Asians and Hispanics. Many foreign students in the summer.

We get quite a variety of patrons: infant through elderly and low to middle income. Many families in the neighborhood are immigrants from El Salvador and Brazil. We have a high volume of Spanish speaking families followed by Portuguese, French-Creole and Chinese.

Hartford is about 40% African or African American, 50% Caribbean, Mexican, Central American or South American Spanish-speaking, and 10% European/Asian heritage. It is the second poorest city of its size in the U.S. It has a large refugee/recent arrival population.

My community is very diverse. It is a transitional community for new immigrant populations. By the time they learn English, most of them will leave for some place else.

Libraries typically served a very wide range of ages, from babies to the elderly, and in most communities, many families who may be economically struggling. Some librarians described how their programming offerings and resources addressed particular segments of their population.

[Our town] is an ethnically diverse working/middle class community. Since we have a literacy program for adults which mostly attracts patrons for whom English is a second language, and since we offer internet access, as well as programming for all ages, I’d say that we serve an ethnically diverse clientele that represents the composition of our town.

Mid to lower middle class families are those who frequent programs. Children from income-challenged families (mostly single parent households) use the library as an afterschool turf/computer access. If an attractive activity is going on, some of the kids will join in, if we have the room to include them. (This is often the case with the MotS sessions.)
One librarian described how her library served a highly urban, low income community, while across town, in the same city, another branch was much more “suburban.” Some of our comparison group libraries were located in communities which served working class families during much of the year, but as a coastal community, had an influx of wealthy summer residents. As one librarian described her patrons, “White, Native American and Brazilian low income-middle in winter; wealthy in summer.” Thus, these libraries grappled with not only the dramatically higher attendance levels in the summer, as noted earlier, but also radical shifts in the types of populations that they were striving to serve.

Effects of the Economy

In addition to the significant challenges in serving their diverse local communities well, librarians mentioned how the downturn in the economy has significantly affected their library budgets, staffing, programming and ability to serve their communities. In their post-program surveys, 90% of the librarians indicated that they had observed changes in their library, which they attribute to the tighter economic climate.

Librarians described sharply reduced library budgets, with subsequent cuts in staffing, budgets for materials and programs, some forced reduction of days and hours the libraries are open, and some closing of branches:

Before the budget slash, we ran two weekly children’s programs during the school year. During the summer of ’07, we were running four. Loss of funding, fewer hours (from 40 to 25 per week) and the loss of a valued staff member have curtailed programming.

We have lost 7 staff members to attrition or layoffs. We no longer have funds to hire subs, so there are times that the children's room is not staffed at all for more than an hour at a time.

We have 35 fewer librarian hours, plus fewer support staff (shelvers). We are ordering less materials and can no longer pay for outside programs. We are expecting more cuts.

We have not been able to buy any books since Nov. and have no money for programming. In December we began closing on Sundays and have not re-opened for Sunday service.

We have other branches, but they were closed due to budget constraints.

Concurrent with these significant budget cuts, librarians report a dramatic increase in visitation by both adult and child patrons, and in circulation.

Increase in circulation, as the financially strapped public realizes their local libraries offer a wide variety of quality materials (movies, books, music), resources (internet,
ESL classes) and services (story times, after-school programs) for FREE!

The library is busier than ever. We have had to add an additional preschool story hour to our schedule. Perhaps people are choosing to utilize the library's free programs because they are unable to pay for preschool.

More children coming here after school waiting for someone to pick them up, more use in general of AV and book collection.

Circulation is up, participation in homework assistance is up, museum pass requests are up, Saturdays are busier.

More adult patrons are coming in and requiring assistance as well.

Two librarians described the resulting “squeeze” – significantly reduced budgets, staffing, and library hours exacerbated by increased patron need, visitation and circulation – in the following way:

We have many adults coming in looking for help with job searches; our staff is dwindling and due to a hiring freeze, we are unable to fill open positions - which means all of us are stretched thin, and unable to spend much time on our own work; we have a budget freeze as well, making it very difficult to purchase any materials for programs.

Higher circulation figures along with the departure of two key staff members (young adult librarian and children's library assistant) whose positions were frozen. These factors have greatly increased my and my colleagues’ workload as we absorb the tasks previously performed by the two people who left.
CONCLUDING REMARKS

Our baseline surveys revealed the impressive capability of public libraries to reach diverse, underserved children and families, through a dedicated cadre of library staff committed to serving their local communities. Most libraries offer a variety of children’s programs and services, usually on a weekly basis. Ongoing programs and partnerships with after-school and community groups is fairly uncommon, as librarians are already busy striving to serve their child and family library patrons, often with limited staff and program hours. In general, children’s librarians only rarely address mathematics in their children’s programs and offerings, but expressed an interest and openness to learning to do so, underscoring the untapped potential of utilizing public libraries for enhancing children’s mathematical learning.

In a number of libraries, there are only one or two children’s librarians on staff. In these cases, the staffs’ ability to plan and provide programming for elementary school age children meets with competing demands to cover book circulation, patron assistance, programming for younger children, and outreach to schools and daycare centers. Given that children’s librarians need a variety of approaches for incorporating mathematics, including ones that children can pursue independently with minimal adult facilitation, the MotS project’s development of a range of different program and materials formats (e.g., story times, crafts, games, interactive bulletin board displays, handout sheets) is sound. Similarly, since many librarians do not offer multi-week programs for which a child’s regular attendance across sessions is expected, the numerous robust and engaging stand-alone MOTS activities are an appropriate fit for the programming structure.

Some librarians naturally turn to their own childhood experiences of learning mathematics in school, and have initially equated mathematics to numerals, counting, basic operations, and word problems, as well as feel some level of apprehension about the subject. Nonetheless, many librarians are able to build on their previous mathematics-related work with younger children, where they may have led story times featuring counting books and counting songs, or featured mathematics more implicitly through hands-on crafts activities. MotS project efforts – through materials development, technical support and workshops – will continue to provide important opportunities to broaden librarians’ understanding of the range of mathematical concepts, topics, and skills pertinent for elementary school children, and how best to foster children’s problem-solving strategies, mathematical discussions and sharing of math-related ideas.

Librarians are accustomed to working with multi-age groups and customarily adapt materials depending on the age group. Regular programming specifically targeting elementary school children varies depending on the library, with different forms of clubs (e.g., book clubs, chess clubs, “junior friends of the library”) being popular with upper elementary school and middle school youth. A number of librarians typically enlist the help of upper elementary school-aged, “tweens” and teens to help younger children. Various features of the MotS activities -- provision of three general grade levels (early, middle, and upper elementary grades), tips for adapting an activity for a multi-age group of children and background information on children’s common misconceptions for
particular mathematics concepts -- also appropriately help librarians accommodate children of various ages and provide programs for families. It may also be interesting to explore how engaging children in the upper elementary grades could evolve into alternative group structures and roles, such as clubs or older children assuming dual roles as both learners and helpers in group activities. Such regular voluntary engagement in mathematics at the library could help children acquire, consolidate, and reinforce their understanding and appreciation of mathematics.

Ongoing programs and partnerships with after-school and community groups is fairly uncommon, as librarians already have a lot on their plates in striving to serve their child and family library patrons, often with limited staff and program hours. Thus, the MOTS project staff has been wise to first accommodate their librarian participants, focusing on how best to incorporate mathematics into their regular library programming, rather than emphasizing or requiring outreach work with community groups.

Analysis of our pre- and post-program surveys revealed a clear, initial impact of MotS on a range of librarians’ practices, behaviors, knowledge and attitudes. MotS librarians increased the regularity with which they engaged a range of mathematics-related behaviors in their interaction with children and colleagues. For example, librarians reported an increase in the frequency with which they featured mathematics in various library offerings, routinely pointed out role of math in everyday life to children, and could now readily explain to children how math is relevant to using the library.

Almost all the librarians indicated that their thinking about the role of math in library activities for grades K-6 had changed through their participation in MotS. Librarians described a wide range of changes, including broader notions of mathematics and its connections to daily life, greater comfort with mathematics and heightened awareness of mathematical opportunities in their libraries, and dedication to incorporating mathematics in their library programs and routines.

Such sentiments are captured by several of the MotS librarians, in the following way:

The whole idea of incorporating math skills into children’s library programs is exciting and not something that would have occurred to me before I was introduced to MotS. The suggested ideas have been very helpful and have gone a long way toward helping me overcome the intimidation I feel around math! I like the idea of helping kids overcome that intimidation.

I have always liked math and have wanted to find a way to include it in library programming but have never had the time to figure out how. It is great to see how easy it can be – “genius in simplicity.” We think of our library as a community center and so take a broad view of activities for the kids/public. This broadens the public’s view of what libraries do….I feel much more open to branching into “non traditional” library activities and looking for the connections to math and literacy. I have more confidence that I will be able to identify and communicate these connections to kids. I
can talk about math without feeling/acting like a classroom teacher. I can use my creativity in a broader arena with math activities.

I feel positive and optimistic about the potential to weave math activities into our daily programs and activities. I think this [project] has helped me to recognize how integral math concepts are in all parts of life – this makes it easy to identify and utilize them.

As Year 2 concluded with the advent of summer 2009, many librarians stated that the economic downturn they had experienced the past year has significantly and adversely affected their library budgets, hours, staffing levels, programming and overall ability to serve their diverse local communities well. They expressed concern that library cuts would continue in the months to come. As a result, librarians were particularly appreciative of MotS activities that did not require a structured children’s program as the method for delivery, as they were anticipating the need to reduce their level of children’s programming in the coming year.

Our Year 3 evaluation will continue to chart the extent to which MotS librarians are able to sustain the clear growth in offering mathematics programs in their libraries that they have demonstrated this past year. It will also examine how some participating librarians take on increased leadership roles to help train and support fellow librarians to enhance children’s mathematical learning in their libraries. Furthermore, the Year 3 evaluation will study how the MotS project reaches and trains librarians in additional regions across the country beyond the Northeast, and the subsequent impact of the project on the librarians’ programs, practices, institutions, and communities.
ACKNOWLEDGEMENTS

We wish to acknowledge the contributions of the following individuals for their insights, assistance and support in this study: Marlene Kliman, Nuria Jaumot-Pascual, Martha Merson, Lily Ko, and Julie Friesner.

Also, our deep appreciation to the participating librarians and regional library consultants in Massachusetts, Connecticut, and New York, who met and spoke with us, responded to our written surveys, and shared their experiences and perspectives.

Cynthia A. Char, Ed.D.
Michael D. Foote

For further information on the study, contact:

Dr. Cynthia Char
Char Associates
147 Connor Road
Montpelier, VT 05602
www.charassociates.com
1. Welcome!

This survey is part of the evaluation of the Mixing in Math project (also called Math off the Shelf), based at TERC. The evaluation is being conducted by Char Associates, an independent evaluation organization.

Thank you for your willingness to complete this questionnaire. Your honest responses and thoughtful comments will help us better understand the libraries in your region. Confidentiality is important to us; no names or personally-identifying information will be used in reporting this information.

Please note that this survey is designed to provide us with background information, and you need not have started Mixing in Math in order to fill it out.

Thank you!

--Cindy Char, Char Associates

2. Introduction

* 1. Your name

2. Name of your library

3. Your library's town/city and state

3. Services for Children in Grades K-6

4. Which of the following kinds of activities or programs do you offer elementary school-age (K-6) children? (SELECT ALL THAT APPLY.)

- Homework assistance
- Occasional programs after school
- Regular weekly activities such as crafts, book clubs, games
- Regular monthly activities such as crafts, book clubs, games
- Special family events
- Other (please describe):

   [Enter Other Details Here]
5. On average, how many times per week do you offer structured activities (such as story times, crafts, special programs, etc.) geared for elementary school-age (K-6) children?

<table>
<thead>
<tr>
<th>Times per week:</th>
<th>During the SCHOOL YEAR</th>
<th>During the SUMMER</th>
</tr>
</thead>
</table>

If "other," please describe below:

6. Is prior sign-up typically required for your K-6 programs?
   - Yes
   - No

7. Do you offer any programs for elementary school-age children that are designed as multi-week (3 to 6+ weeks) programs, for which children's regular weekly attendance is expected and strongly encouraged?
   - Yes
   - No

   If yes, please briefly describe one such program:

8. Do elementary school-age children have regular internet access at the library?
   - Yes
   - No
   - Other (please specify)
4. Services for Children in Grades K-6 cont.

9. In the YEAR BEFORE YOU STARTED MIXING IN MATH (also known as Math off the Shelf), how often did you/your staff include math in offerings for elementary school-age K-6 children?

<table>
<thead>
<tr>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Story times</td>
</tr>
<tr>
<td>b) Crafts</td>
</tr>
<tr>
<td>c) Posters or bulletin boards</td>
</tr>
<tr>
<td>d) Book displays</td>
</tr>
<tr>
<td>e) Handouts / Take-home sheets</td>
</tr>
<tr>
<td>f) Family programs</td>
</tr>
<tr>
<td>g) Other</td>
</tr>
<tr>
<td>(please specify in box below)</td>
</tr>
</tbody>
</table>

Please describe "other" below:


10. If you have included math in your offerings in the YEAR BEFORE YOU STARTED MIXING IN MATH, please give some examples of the ways you included math:


5. Services (continued)

11. Think back to your work as a librarian the YEAR BEFORE YOU BEGAN MIXING IN MATH. How true would you say each of the following statements was? Select the BEST answer. Please note that there are no right or wrong answers – we are just establishing a baseline from which to gauge change.

Options

a) I routinely pointed out the role of math in everyday life to children (e.g., math in cooking, shopping, measuring).

b) I regularly discussed the role of math in everyday life and library use with my colleagues.

c) I often incorporated math into the activities I led with elementary school-age (K-6) children.

d) I often included children’s books with mathematical themes and concepts in story times, displays, and programs.

e) I frequently used fiction books and storybooks that do not have mathematical themes as a basis for math activities and mathematical discussions.

12. (Question #11, continued)

Options

f) I regularly used non-fiction books that do not have mathematical themes as a basis for math activities and mathematical discussions.

g) I often created and implemented fun library activities that included math.

h) I could readily explain to children how math was relevant to using the library.

i) I often shared ideas on using math in story times, displays, and programs with other children’s librarians.

j) I could explain to colleagues (co-workers and directors) several ways in which math for grades K-6 supported the mission of our library.
3. More About Your Library

13. Currently, in the AFTERNOONS AFTER SCHOOL, we typically see:

14. On a SATURDAY MORNING, we typically see:

15. On a day during the SUMMER, I estimate the number of elementary school-age children we typically see is about:

16. When leading structured activities for grades K-6, how do you/your staff handle multi-age groups? (SELECT ALL THAT APPLY.)
   - Older children (e.g. grades 5, 6) are "helpers"
   - Staff adapt activities for different age groups
   - Teen staff / teen workers are "helpers"
   - Other strategy (please describe):

17. In the past two years, has your library formally offered programs for elementary school-aged children to afterschool groups (such as scouts, community centers or groups, etc.)?
   - Yes
   - No

   If yes, please describe the nature of the programs you’ve offered, and the kinds of groups you’ve worked with.

18. What demographic does your library serve? (e.g., ethnic composition of library patrons/visitors, income diversity, etc.)
19. Number of library staff working in children’s services in your library, when you’re fully staffed (full-time equivalent):

<table>
<thead>
<tr>
<th>Number of staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Professional librarians</td>
</tr>
<tr>
<td>b) Non-professional staff</td>
</tr>
<tr>
<td>c) Adult volunteers</td>
</tr>
<tr>
<td>d) Teen staff/volunteers</td>
</tr>
<tr>
<td>e) Other (please describe below)</td>
</tr>
<tr>
<td>f) Total library staff working with K-6 children</td>
</tr>
</tbody>
</table>

*(total rows a through e)*

Please describe "other" below:


20. Are new staff serving grades K-6 provided with orientation or pre-service training?

- Yes
- No

21. Any other comments you’d like to share about you and your library that you think we’d find helpful:


7. Thank you for taking the time to complete this survey!
Greetings! Thank you for your willingness to complete this survey. To be eligible to complete this survey, you must work in a public library, and be responsible for delivering programs to elementary school-aged (K-6) children.

Your honest responses and thoughtful comments will help us better understand the libraries in your region. Confidentiality is important to us: no names or personally-identifying information will be used in reporting this information.

If you work in more than one library, please select the public library you work in the most as the basis for your survey responses.

If there is more than one children's librarian in your library who received this survey invitation, only one of you needs to fill out this survey.

Thank you!

--Cindy Char, Char Associates

**2. Your name**

**3. Name of your library**

**4. Your library's town/city and state**

**5. My library is:**

If selected "other," please describe here:

**5. My role at my library is as:**

If selected "other," please describe here:
“Mixing in Math” is a project on engaging children in mathematics through public libraries, directed by TERC (an educational group in Cambridge, MA).

7. Have you attended a “Mixing in Math” workshop, seen or used any “Mixing in Math” activities, or accessed the “Mixing in Math” web site?

☐ Yes
☐ No

If Yes, please describe how you heard about Mixing in Math, and the type of project involvement and contact you have had thus far:


8. Which of the following kinds of activities or programs do you offer elementary school-age (K-6) children? (Select all that apply.)

☐ Homework assistance
☐ Occasional programs after school
☐ Regular weekly activities such as crafts, book clubs, games
☐ Regular monthly activities such as crafts, book clubs, games
☐ Special family events
☐ Other (please describe):

9. On average, how many times per week do you offer structured activities (such as story times, crafts, special programs, etc.) geared for elementary school-age (K-6) children?

<table>
<thead>
<tr>
<th></th>
<th>During the SCHOOL YEAR</th>
<th>During the SUMMER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Times per week:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If “other,” please describe below:
10. Is prior sign-up typically required for your K-6 programs?
   - Yes
   - No

11. Do you offer any programs for elementary school-age children that are designed as multi-week (3 to 6+ weeks) programs, for which children's regular weekly attendance is expected and strongly encouraged?
   - Yes
   - No
   If yes, please briefly describe one such program:

12. Do elementary school-age children have regular internet access at the library?
   - Yes
   - No
   - Other (please specify)

Metrowest Librarian Survey

Services for Children in Grades K-6 cont.

13. Think about your work in your library this past year. How often did you/your staff include math in offerings for grades K-6?

   Options

   a) Story times
   b) Crafts
   c) Posters or bulletin boards
   d) Book displays
   e) Handouts / Take-home sheets
   f) Family programs
   g) Other
      (please specify in box below)

   Please describe "other" below:

14. If you have included math in your offerings this past year, please give some examples of the ways you included math:
15. Think back on your work as a librarian this past year. How true would you say each of the following statements was? Select the BEST answer. Please note that there are no right or wrong answers – we are simply gathering background information on the types of practices libraries typically engage in.

a) I routinely pointed out the role of math in everyday life to children (e.g., math in cooking, shopping, measuring).

b) I regularly discussed the role of math in everyday life and library use with my colleagues.

c) I often incorporated math into the activities I led with elementary school-age (K-5) children.

d) I often included children’s books with mathematical themes and concepts in story times, displays, and programs.

e) I frequently used fiction books and storybooks that do not have mathematical themes as a basis for math activities and mathematical discussions.

16. (Question #14, continued)

f) I regularly used non-fiction books that do not have mathematical themes as a basis for math activities and mathematical discussions.

g) I often created and implemented fun library activities that included math.

h) I could readily explain to children how math was relevant to using the library.

i) I often shared ideas on using math in story times, displays, and programs with other children’s librarians.

j) I could explain to colleagues (co-workers and directors) several ways in which math for grades K-6 supported the mission of our library.
17. Please indicate the response that best fits your view of the role of math in your library offerings for grades K-6. Please do not include math homework help or test preparation as part of what is considered “math-related programming.”

<table>
<thead>
<tr>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) We already do a great deal of math-related programming for grades K-6.</td>
</tr>
<tr>
<td>b) Literacy, social studies, and the arts are a better fit with our programs than math.</td>
</tr>
<tr>
<td>c) Including more math in our programs for grades K-6 is a strong priority.</td>
</tr>
<tr>
<td>d) We have no time or staff to offer math-related programming.</td>
</tr>
<tr>
<td>e) Homework help and test preparation seem the most appropriate way for libraries to support children’s mathematics learning.</td>
</tr>
<tr>
<td>f) I would be interested in attending a 2-hour workshop on how to make math a greater part of our programming for grades K-6.</td>
</tr>
</tbody>
</table>

**Metrowest Librarian Survey**

**More About Your Library**

18. Currently, in the AFTERNOONS AFTER SCHOOL, we typically see:

19. On a SATURDAY MORNING, we typically see:

20. On a day during the SUMMER, I estimate the number of elementary school-age children we typically see is about:

21. When leading structured activities for grades K-6, how do you/your staff handle multi-age groups? (SELECT ALL THAT APPLY.)

- Older children (e.g. grades 5, 6) are “helpers”
- Staff adapt activities for different age groups
- Teen staff / teen workers are “helpers”
- Other strategy (please describe):
22. In the past two years, has your library formally offered programs for elementary school-aged children to afterschool groups (such as scouts, community centers or groups, etc.)?

☐ Yes
☐ No

If yes, please describe the nature of the programs you've offered, and the kinds of groups you've worked with.


23. What demographic does your library serve? (e.g., ethnic composition of library patrons/visitors, income diversity, etc.)


24. Number of library staff working in children's services in your library, when you're fully staffed (full-time equivalent):

<table>
<thead>
<tr>
<th></th>
<th>Number of staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Professional librarians</td>
<td>✔</td>
</tr>
<tr>
<td>b) Non-professional staff</td>
<td>✔</td>
</tr>
<tr>
<td>c) Adult volunteers</td>
<td>✔</td>
</tr>
<tr>
<td>d) Teen staff/volunteers</td>
<td>✔</td>
</tr>
<tr>
<td>e) Other (please describe below)</td>
<td>✔</td>
</tr>
<tr>
<td>f) Total library staff working with K-6 children (total rows a through e)</td>
<td>✔</td>
</tr>
</tbody>
</table>

Please describe "other" below:


25. Are new staff serving grades K-6 provided with orientation or pre-service training?

☐ Yes
☐ No
26. My educational training and degree(s):


27. Number of years I’ve worked as a children’s librarian:

28. Description of my favorite type of public library program for grades K-6 children:

29. Any other comments you’d like to share about you and your library that you think we’d find helpful:

30. If you would like to be entered in the drawing for a $20 Amazon gift certificate, please enter your email address below. Your email address will not be given to any outside party and will be erased at the conclusion of our evaluation.

Thank you for taking the time to complete this survey!
Welcome!

This survey is part of the evaluation of the Mixing in Math project (also called Math off the Shelf), based at TERC. This Spring 2009 survey is designed to deepen our understanding of your library programming, and some of your experiences with Mixing in Math the past few months.

The evaluation is being conducted by Char Associates, an independent evaluation organization.

Thank you for your willingness to complete this questionnaire. Your honest responses and thoughtful comments will help us better understand the libraries in your region. Confidentiality is important to us; no names or personally-identifying information will be used in reporting this information.

Please note that this survey is designed to provide us with information on libraries that have started using the Mixing in Math program.

Please have your binder of MIM activities on hand to refer to as you respond to this survey.

The survey should take you approximately 10-20 minutes to fill out.

Thank you!

--Cindy Char, Char Associates

Introduction

1. Your name

2. Name of your library

3. Your library’s town/city and state

4. My library is:

   -

   If selected "other," please describe here:
5. My role at my library is as:

If selected "other," please describe here:

6. My educational training and degree(s):

7. Number of years I’ve worked as a children’s librarian:

8. When did you first begin using MIM activities with children:

9. In the past six months, how often did you/your staff include math in offerings for grades K-6?

Options

a) Story times
b) Crafts
c) Posters or bulletin boards
d) Book displays
e) Handouts / Take-home sheets
f) Family programs
g) Other
(please specify in box below)

Please describe "other" below:
10. MIM and Your Children

Please refer to your MIM binder of activities when responding to this question. Think back on the various MIM activities that you've used with children in your library the past three months. In your opinion, which MIM activity do you think was most successful in promoting children's math learning? Please name the activity, how you implemented it, and describe children's reactions to the activity.

11. MIM and You

In the last 3 months, have you designed and used any of your own activities that are based on or similar to those in MIM?

☐ Yes

☐ No

If "yes," please describe here:

12. Has your thinking about the role of math in library activities for grades K-6 changed, through your participation in MIM?

☐ Yes

☐ No

If "yes," in what ways?
13. Think back upon the last 3 months. How true would you say each of the following statements are? Select the BEST answer (that most accurately captures your work as a librarian). Please note that there are no right or wrong answers.

a) I routinely pointed out the role of math in everyday life to children (e.g., math in cooking, shopping, measuring).

b) I regularly discussed the role of math in everyday life and library use with my colleagues.

c) I often incorporated math into the activities I led with elementary school-age (K-6) children.

d) I often included children’s books with mathematical themes and concepts in story times, displays, and programs.

e) I frequently used fiction books and storybooks that do not have mathematical themes as a basis for math activities and mathematical discussions.

14. (Question #13, continued)

f) I regularly used non-fiction books that do not have mathematical themes as a basis for math activities and mathematical discussions.

g) I often created and implemented fun library activities that included math.

h) I could readily explain to children how math was relevant to using the library.
* 15. To what degree do you think your participation in MiM has changed the way you interact with grades K-6 children outside of specific MiM programs you conduct?

Options

a) the type of books you choose to feature in story times

b) the way you lead story times (i.e., how you present books, engage children)

c) the way you lead crafts activities (i.e., how you present activity, engage children)

d) how you ask children questions

e) how you show them around the library

f) how you talk with them about books

* 16. Is there a core group of elementary school children that regularly comes to your library (usually at least once a week)?

   ☐ Yes

   ☐ No

Librarian Post Survey: Spring 2009

Questions Re: Core Group of Children

17. Approximately how many children are in that core group that regularly come to your library?

   [ ]

   If you chose "31 or more", please type in the number in your core group here:

   [ ]

18. What's the approximate age (number of years) of the youngest member of this core group?

   [ ]

19. What's the approximate age of the oldest member of this core group?

   [ ]
20. Do these children primarily tend to come to (check all that strongly apply):

- a) Engage in a regular structured program you offer (please describe below)
- b) Look at, read, or check out books in our collection
- c) Use the library’s computers
- d) Receive homework assistance from library staff
- e) Get a snack
- f) Hang out and socialize with other children
- g) Wait for a parent or older sibling to pick them up
- h) Other (please describe below)

If the children tend to come to attend a regular, structured program you offer, please describe the program here (also, please describe "h - other" if checked, here as well):


Librarian Post Survey: Spring 2009

Mixing in Math Project: After-school Groups, Family Program, etc.

*21. In the past three months, have you offered any MIM-based programs for elementary school-aged children to after school groups (e.g., scouts, Boys and Girls Clubs, community centers or groups)?

- Yes
- No

22. If "yes," you have offered MIM to after school groups, what kind of program did you offer? (please check all that apply)

- A library tour
- An invitation to join an already scheduled structured program
- A one-time special program offered specifically to the after-school group
- A visit to the community group's facility to provide an activity
- An invitation to come to a public program
- Other (please describe below):
If yes (you have offered a MIM program to a community group), please describe one such program (the type of community group you worked with, age/grade range and approximate number of children, the activity you offered, and the response from the children who participated):

* 23. In the past three months, have you included MIM in a family program?
   - Yes
   - No

24. If yes (you have offered a MIM family program) was it:
   - a) a whole-group session focused on one or two MIM activities;
   - b) a “station-based” set-up in which families circulated among various MIM activities
   - c) a whole-group session in which you slipped in a short MIM activity
   - d) Other (please describe):

Please describe your MIM family program (include the approximate number of children, the approximate number of adults, the nature of the activity, and any feedback you received from parents):
25. Please indicate the response that best fits your view of the role of math in your library offerings for grades K-6.

Please do not include math homework help or test preparation as part of what is considered “math-related programming.”

Options

a) Literacy, social studies, and the arts are a better fit with our programs than math.

b) Including more math in our programs for grades K-6 is a strong priority.

c) We have no time or staff to offer math-related programming.

d) Homework help and test preparation seem the most appropriate way for libraries to support children’s mathematics learning.

e) I would be very interested in learning more about how to make mathematics be a greater part of the programs we do with elementary school (K-6) children.

26. Looking back over the past three months, how successful do you think you were in using MIM materials to promote elementary school children’s learning and enjoyment of mathematics?

Options

27. To successfully implement any library program, a number of factors can sometimes help increase that success. How important were each of the following elements to optimizing your successful implementation of MIM at your library?

Options

a) Quality of MIM materials

b) Range of MIM activity formats (e.g., programs, bulletin boards, handouts, etc.);

c) Librarian meetings hosted by TERC

d) List-serve submissions and exchanges with other MIM librarians

e) Phone calls from TERC staff for questions and support
28. When attempting to implement any library program, a number of factors can sometimes hinder its success. Please rank how much you agree with the following statements:

We/I would do a much better job implementing MIM if...

<table>
<thead>
<tr>
<th>Statement</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had more background information and directions in MIM materials</td>
<td></td>
</tr>
<tr>
<td>I had more training on how to use MIM</td>
<td></td>
</tr>
<tr>
<td>I had more time to plan MIM activities</td>
<td></td>
</tr>
<tr>
<td>MIM activities required less space</td>
<td></td>
</tr>
<tr>
<td>MIM activities involved less noise</td>
<td></td>
</tr>
<tr>
<td>MIM activities involved fewer hands-on materials</td>
<td></td>
</tr>
<tr>
<td>I was more interested in math</td>
<td></td>
</tr>
<tr>
<td>I was more comfortable with math</td>
<td></td>
</tr>
<tr>
<td>My library leadership was more supportive of my implementing MIM and math-related activities</td>
<td></td>
</tr>
<tr>
<td>Children’s math learning was a higher priority in our library’s mission.</td>
<td></td>
</tr>
<tr>
<td>Our library’s general outreach efforts were stronger</td>
<td></td>
</tr>
<tr>
<td>Other: (please describe)</td>
<td></td>
</tr>
<tr>
<td>If &quot;other,&quot; please describe here:</td>
<td></td>
</tr>
</tbody>
</table>
29. Every job has a variety of tasks and responsibilities that compete for one’s time, and need to be prioritized. Below is a list of responsibilities that may be part of a children’s librarian’s job.

Of the following choices, which three do you see as the most important (highest priority) parts of your job? Place a check next to those three.

(Note: If for some reason you can not see a first item in this question, due to a problem with the browser, the first item should read, “Maintain and offer a high quality children’s book collection to patrons.”)

1) Maintain and offer a high quality children’s book collection to patrons
2) Offer support in helping children and families use the book and media collection (e.g., find books they are looking for, make suggestions for reading)
3) Offer high quality children’s programs for preschoolers and toddlers
4) Offer high quality children’s programs for elementary school aged children (K-6)
5) Offer homework assistance to children
6) Offer support to parents
7) Help patrons check out books

30. Of the following choices, which three do you see as the most time-intensive (occupies the most time) parts of your job? Place a check next to those three.

1) Maintain and offer a high quality children’s book collection to patrons
2) Offer support in helping children and families use the book and media collection (e.g., find books they are looking for, make suggestions for reading)
3) Offer high quality children’s programs for preschoolers and toddlers
4) Offer high quality children’s programs for elementary school aged children (K-6)
5) Offer homework assistance to children
6) Offer support to parents
7) Help patrons check out books
31. Since last summer (August 2008), have you noted any changes in your library which you attribute to the tighter economic climate? These changes could be differences in library clientele, types and levels of services needed/requested, and/or changes in library staffing, budget, program and/or services.

☐ Yes (please describe below)

☐ No

If “yes,” please describe here:

32. Any other final thoughts or comments you wish to share, that helps us better understand you, your library, and your participation in the MIM project:

Thank you for taking the time to complete this survey!