ALL CHILDREN READING:
A GRAND CHALLENGE FOR DEVELOPMENT

Final Report

Matching Children with Level-Appropriate Books and Engaging Families

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June 2017

QUÉ FUNCIONA PARA EL DESARROLLO

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1. Introduction

Literacy is fundamental to learning, skill acquisition and, consequently, to other long-term outcomes. Most of the formal learning of reading and the formation of lifelong reading habits take place in early primary grades. At this stage, children learn and practice reading through direct instruction and independent reading (Cullinan, 2000; Krashen, 2004). Children test their new knowledge (reading) with the books and prints to which they have access at home and school (Mesmer, 2008). Therefore, exposure to printed texts and opportunities to practice reading, both inside and outside the school setting, are crucial for the development and consolidation of basic reading skills (Anderson et al., 1988). Research has shown that, in addition to teachers, family involvement and access to level-appropriate reading materials are essential for the development of reading skills and good reading habits, especially among emergent and beginner readers (McGill-Franzen, 1993; Reimers, 2006; DeBruin-Parecki, 2006).

Families play a crucial role on supporting literacy acquisition and improving their children's reading skills (Snow, et al., 1998). Parental involvement has been related in previous work to academic performance (McNeal, 1999; Scribner et al., 1999; Yan & Lin, 2002), school readiness (Lin, 2003), and both social and emotional development (Bredekamp & Copple, 1997; Fantuzzo, & McWayne, 2002). In fact, performing simple activities, such as reading to young children, has been associated to better vocabulary development and superior later reading skills (Snow, et al., 1998).

Research indicates that children remain dependent on the quality of their home literacy environment as they progress through school. Growing in a poor literacy environment has been linked to lower reading knowledge and skills at school entry (Nord et al., 2000). Children from low-SES families are often at greater disadvantage because they tend to have limited access to reading materials at home and their parents lack information on how to support their reading development. In fact, many parents report being unsure on how to help their children learn to read and acknowledge the need for tools and guidance to support them in this task (National Commission on Children, 1991). This becomes even more challenging when parents, who are children's immediate role models, have poor reading habits and low reading skills.

To spur reading skills, evidence suggests that books should be tailored to each child's reading level and interests (Allington, 2002; RAND Reading Study Group, 2002; Fountas & Pinnell, 1996; Worthy, 1996; McGill-Franzen, 1993). Adequate reading materials, improve reader's current skills and expand his reading strategies (Fountas & Pinnell, 1996). That is, books should be engaging and challenging enough but not too difficult (within their Zone of Proximal Development) to provide useful practice. Following this theory, different methodologies have recently been developed to match students' reading abilities to books' text complexity level. Book-leveling frameworks –like Lexile, ATOS, DRA, and Fountas & Pinnell—are being used in countries like the United States. However. these frameworks have been mainly designed for an English-speaking context, where linguistic structure is different from Spanish. The adaptation of these frameworks to different phonology, orthography, and syntax structures, such as Spanish-written texts, is not straightforward. Recently, efforts have been conducted in the U.S. to create book-leveling versions of these frameworks for Spanish-written texts targeting English Language Learners (ELL). Still, most of the books classified and students' benchmark assessments are not available in less developed countries. In addition, book-leveling frameworks and readability formulas are very limited for early grade readers, often creating broad or imprecise book level classifications, or none, for this age group (Mesmer, 2008). Nevertheless, finding a "right" text is most important with beginning readers, who are developing their reading skills and are affected by distinctive features of texts, like format and illustrations.

Children benefit the most from books that match their interests and skill level –are engaging and challenging but not too difficult (Allington, 2002; RAND Reading Study Group, 2002). Books that are too difficult can produce frustration, while those that pose little challenge can lead to boredom (Routman, 2003). Despite that, children without guidance tend to choose books that are visually appealing even though they are difficult for them to read independently. In this sense, families can play a key role helping children in the selection of books and scaffolding their reading activities at home. Thus, it is natural to ask how to guide children to choose level-appropriate books

In Mexico, many primary school students are not reading at grade level (Díaz & Flores, 2010), many parents often are unsure on how to help them learn to read, and some teachers struggle with large and heterogeneous classrooms where children are not reading at the same level (Ortega-Hesles, 2012). In this setting, the school curricula[1] and practices often follow a "one size fits all" approach to teach reading. Like in other Spanish-

[1] The national curricula focus on reading decoding and fluency in Grades 1 and 2, and on reading comprehension starting in Grade 3.

speaking countries, no systematic book-leveling methodology is used today in Mexico to support access to appropriate reading materials for children with different reading abilities within a grade or classroom.[2]

Recognizing the relevance of family involvement and access to adequate-level books for early grade readers in Spanish-speaking contexts, in 2015, *Qué Funciona para el Desarrollo* (QFD), a Mexican non-profit organization, started the program called *Mundo de Libros* (MdL). *Mundo de Libros* was developed as part of the "Matching Children with Level-Appropriate Books and Engaging Families" project. This initiative was possible thanks to the collaboration with Fundacion Proacceso ECO[3] and to generous support of the *All Children Reading: A Grand Challenge for Development* Partners: the United States Agency for International Development (USAID), World Vision, and the Australian Government.

Mundo de Libros aims to improve the reading skills and habits of students enrolled in Grades 1 to 3 in Spanish-speaking countries. It uses an innovative technology-based tool that matches children with level-appropriate books; that is, books that meet their reading skills and their topics of interest. In addition, it seeks to foster parents' engagement in their child's reading activities.

In this report, we explain the components of the *Mundo de Libros* program and present the quantitative and qualitative results for the first stage of the project (Feb 2015-April 2017) funded under the Second Round of the *All Children Reading: A Grand Challenge for Development.* The remainder of this report is organized as follows. In the next section, we describe the context, the program, and pose specific research questions. In the following section, we detail the research design, instruments and datasets. We next present the quantitative and qualitative analysis of the implementation of this program. We conclude with a discussion of the findings and opportunities for scalability.

2. Background

2.1. Reading in Mexico

In the last decades, Mexico has reduced considerably illiteracy and has achieved almost universal primary education. Unfortunately, there are still important flaws in terms of

[2] For instance, the National Reading Program (PNL in Spanish) roughly classified some books by grade or education level.
[3] Fundación Proacceso, our implementation partner, is a non-profit organization that employs technology to catalyze economic and social development in low-income communities in Mexico.

reading skills and habits of its population. National and international assessments have revealed the low reading skills of Mexican students, even after controlling for socioeconomic differences (Díaz & Flores, 2010). For instance, in the PISA 2012 international assessment, 41 percent of Mexican students age 15, performed below the basic level of reading skills and about 15 percent had serious reading comprehension problems. At elementary school, 20 percent of third graders in public urban schools scored below the basic reading level and 59 percent scored at the basic level on standardized assessment (EXCALE, 2010). Similar conclusions have been reached with the ENLACE[4] national tests for primary and lower-secondary students.

As mentioned before, families play a key role on the development of reading skills and habits (Reimers & Jacobs, 2008). Nonetheless, the Mexican adult population has poor reading habits according to different surveys. Even though around 86 percent of the households in Mexico report having books at home, 40 percent of them had less than 20 books; most of them were textbooks and encyclopedias (CONACULTA, 2006). According to the National Reading Survey, the average number of books read per capita by adults in 2005 was 2.9; more than half reported that they do not read literature books or they are not used to read this kind of books. Of those surveyed, only 12.5 percent mentioned that they like to read a book in their free time. As expected, this situation is not very different for a younger population: 14 percent of sixth grade students reported reading only school-required materials and of those who read texts not required by the teacher, 32 percent spent less than one hour per week reading (Reimers & Jacobs, 2008). With respect to parental engagement, the only evidence available comes from self-reported indicators. For instance, 36.7 percent of third graders reported that their parents read to them stories and 27 percent answered that their parents always support them with homework.

From a policy perspective, the main literacy program at the national level has been the National Reading Program (PNL for its initials in Spanish), which was created in 2002 but gradually lost funding. PNL sought to promote reading habits among Mexican students. For many years it was successful increasing the stock of books in classrooms and school libraries around the country. However, the use of these materials (now worn out and disappearing) has remained mainly restricted to the school setting while access to non-textbook reading materials outside the school is still limited, particularly among low-income families. In addition, the books selected for PNL as well as for the national school curricula are not always adequate to support the diversity of reading skills of children within a given grade (Ortega-Hesles, 2012).

[4] ENLACE stands for National Evaluation of Academic Achievement in Educational Centers. It was a nation-wide test applied between 2006 and 2013; reading was one of the topics evaluated. ENLACE has been recently replaced by PLANEA.

2.2. The Program

Mundo de Libros is a program which aims to improve reading proficiency and habits of children in grades 1 to 3 while fostering parental engagement in their child's reading. This free program seeks to complement greater parental involvement with an innovative technology-based platform that matches children with level-appropriate books available at a Biblioteca Digital.[5] To achieve this, MdL relies on three core components:

a. ***Access to children's books at the community library and that can be taken home***. Participants have a program passport that works as a library card, allowing them to loan books up to 2 weeks and to keep track of due-dates. Each library in the program received an initial stock of 721 children's books because before they were only equipped with computers and tablets necessary for Fundacion Proacceso's activities. The book collection is diverse in terms of difficulty and topics ensuring that every child will have a wide spectrum of choices.

b. ***Access to adequate-level book recommendations through the web-based platform*** (www.mundodelibros.mx). Each child has an individual profile on the platform, with username and password, through which they get personalized book recommendations according to their previously assessed level of vocabulary and reading skills.[6] Book-leveling is based on both quantitative (e.g. sentence length, word length) and qualitative (e.g. text structure, illustrations) features relevant for beginner readers. Book recommendations are determined by QFD's matching algorithm that considers both the reading level of each child and the characteristics of each book in the MdL catalogue. After logging into the site, participants can choose an avatar, see book recommendations, filter titles according to interests, and search for specific titles, authors or words.[7] The website also allows users to rate the books (on a scale of one to five) after returning them.

c. ***Access to workshops and materials for parents or caregivers.*** The main objectives of these workshops and materials are to: (i) promote parental

[5] Bibliotecas Digitales (BDs) are community spaces to consult and create digital content, access information, read, learn and solve academic, personal, professional and social needs. They are equipped with computers, tablets and Internet, but before the MdL program had no physical stock of books neither library furniture.

[6] To measure receptive vocabulary acquisition, QFD administered Pearson's Spanish version of the Peabody Picture Vocabulary Test, known as the Test de Vocabulario en Imagenes Peabody (TVIP) in Spanish. To measure different reading skills, from phonemic awareness to reading comprehension, QFD adapted the Early Grade Reading Assessment (EGRA) to the Mexican context, with support of a psychometrician and the organization School-to-School. See Section 3.1 for further details.

[7] The platform library system runs on the KOHA open-source system adapted by ZENIT for this specific project.

engagement, (ii) disseminate information and strategies on how to scaffold their children's reading process, and (iii) practical advise on how to create a rich literacy environment at home. The in-person, 1-hour sessions for parents or caregivers take place every two months and have a hands-on approach. Workshop materials are distributed to participants and left in the reading corner for parents that could not attend the session.

During the first stage of the project, a multidisciplinary team of specialists collaborated to develop this version of *Mundo de Libros* (MdL). Implementation of the program began on January 2016 in ten community digital centers, known as *Bibliotecas Digitales* (BDs), operated by Fundacion Proacceso ECO.[8] QFD's and Proacceso's staff promoted the MdL program in the BDs and in nearby public primary schools to attract and recruit students. Promotion included a five-minute explanation of the program and the distribution of flyers. Interested children then had to go with an adult to the BD to receive the registration materials, which included: a description of the program, QFD's privacy policy (required by law), the consent form, and a registration form with contact information and sociodemographic questions. Registrations were received on a first-come, first-served basis. Selected children were required to complete a baseline assessment and survey administered at BDs or collaborating schools.[9] Upon completion of the assessment, the participants received a ticket to exchange for their program passport on the MdL launch date (January 2016).[10]

As part of the program, each of the participating *Bibliotecas Digitales* was equipped with library furniture and a stock of 721 children's books in Spanish.[11] At the libraries, participants could use the existing equipment (computers and tablets) to access the web-based platform. Over a year of operation, MdL has assessed and registered 856 children, enrolled in grades 1 to 3, in urban-marginalized or rural areas of the State of Mexico. Till mid-April 2017, almost 10,000 books had been loaned home and about an equal number is estimated to have been read at the libraries; and a total of 25 workshops for parents have taken place in 5 different libraries.

[8] Fundación Proacceso, our implementation partner, is a non-profit organization that employs technology to catalyze economic and social development in low-income communities in Mexico. These community centers are equipped with computers, tablets and Internet, but before the MdL program had no physical stock of books neither library furniture.
[9] See description on the instruments in Section 3.1.
[10] In three of the ten originally selected libraries, fewer than ten children enrolled. These libraries were replaced with three new libraries, and after an additional recruitment process, a new round of baseline assessments was conducted from February to March 2016.
[11] A later donation, increased the stock to 748 books per library.

2.3. Research Questions

Based on the relevance of family involvement and access to adequate-level books for early grade readers, in this project we sought to explore the following research questions:

RQ1. Does *Mundo del Libros* ***program*** improve vocabulary, reading scores and reading habits of early grade readers, and access to adequate of reading materials compared to children that are not exposed to the program?

RQ2. Does access to the ***MATCH algorithm***, which recommends books tailored to each child's reading profile through access to the web-based MdL platform, improve vocabulary, reading scores and reading habits of early grade readers, and access to adequate of reading materials compared to children that do not have access to the MATCH algorithm?

RQ3. Do ***workshops*** for parents succeed in improving parental engagement in children's reading and consequently, improve the vocabulary, reading scores and/or reading habits of early grade readers compared to sites where parents were not offered the workshops?

3. Evaluation Design

To monitor and evaluate the program, QFD followed a mixed methods approach (i.e. quantitative and qualitative). This approach sought to provide valuable information on the progress and results of the program, as well as to shed light on the findings from the quantitative analysis.[12] In this final report, we describe the results from the quantitative and qualitative analysis of the data collected until April 15th, 2017. It is important to mention that School-to-School is conducting a parallel evaluation of the project.

a. The *quantitative analysis* aimed to measure the potential impact of the program on the reading skills and habits of participants. To assess this, QFD designed a pilot of a Randomized Controlled Trial (RCT) to compare outcomes of children who receive appropriate-level recommendations through the technology-based platform against those who receive random recommendations, for both groups with and without parents' workshop.[13] For the analysis, data on individual performance on vocabulary,

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[13] See Annex A for a description of the design.

reading skills and reading attitudes of participants were gathered at baseline and endline; while reading patterns were tracked throughout the life of program.

b. The *qualitative analysis* played a key role on the monitoring of the program at distinct stages and to get deeper insights on the daily experience of participants. It was based on observations and semi-structured interviews, conducted by an external team (EQUIDE), to different actors of the project: librarians, parents and children. It allowed us to gather information about the fidelity of implementation (FOI) and to make some adjustments to the original design of the program made based on the feedback from the qualitative team.

3.1. Instruments

Different instruments were used as part of the *quantitative* monitoring and evaluation process. For the quantitative analysis, we used data gathered at baseline and endline through three instruments, individually administered by trained enumerators using a tablet: TVIP, EGRA, and a Reading Habits and Attitudes survey. Additionally, QFD used detailed quantitative record information recorded by KOHA library system to track the progress of the program.

TVIP. The "Test de Vocabulario en Imagenes Peabody" (TVIP), which is the Spanish version of Peabody Picture Vocabulary Test,[14] was used to measure receptive vocabulary of participants. The test is administered in the following manner: an assessor says a stimulus word, and the child responds by pointing to one of the pictures displayed on the test easel. A benefit of using the TVIP is that it can be individually administered from the age of two because it does not require reading, neither verbal or written responses. The TVIP used during the baseline assessment contains 125 stimulus words specific to Spanish vocabulary and norms in Mexico. To facilitate data collection, the QFD team designed an app that standardized the administration and scoring rules of the test.

EGRA. To measure different reading skills, from phonemic awareness to reading comprehension, the following EGRA standard subtasks, adapted into Spanish, were used: Letter-sound Knowledge, Initial Sound Identification, Familiar Word Reading, Non-word Reading, Oral Reading Fluency (ORF), and

[14] From Pearson Clinical: www.pearsonclinical.com/language/products/100000487/test-de-vocabulario-en-imagenes-peabody-tvip.html#tab-details

Reading Comprehension. In addition, QFD determined it would be valuable to make two modifications. The first was to add two inferential questions associated with the timed ORF subtask, which normally contains five factual reading comprehension questions. The second modification was to develop and include two additional untimed subtasks: Adaptive Oral Reading Fluency (AORF) and Adaptive Reading Comprehension. These two subtasks helped to better differentiate the reading comprehension level of the sample population.[15] All the answers were captured using a tablet and the Tangerine software.

*Survey. T*o measure reading habits and attitudes, QFD and MetCuantus designed and piloted a short Reading Habits and Attitudes survey. The survey, administered at baseline and endline, includes yes/no questions and questions with a four-Likert scale focused on personal and family literacy activities and behaviors. At endline, this survey also included questions regarding parent-child reading interactions, questions specific to the use of the *Mundo de Libros* components, and some socio-economic questions.[16] All the answers were captured using a tablet and the Tangerine software.

KOHA. The web-based platform of MdL runs on the KOHA open-source library system. This system allows tracking track individual reading patterns, like: loans, renewals, returns, website log-in, score given to each book. Each of these activities is associated to a date and time, and the ID number of each user.

The *qualitative* analysis was based on semi-structured interviews with different actors and on-site observations. Interviews were face-to-face (for active participants) and through phone calls (for not active participants). There was not one single and homogenous instrument used throughout the life of the project; instruments were designed according to the timing of the project, the needs of the research team, and the interviewed actors. That is, the interview protocol varied from the beginning to the end project, and the focus was different for librarians and parents.

[15] The adaptation of EGRA to the linguistic context and the pilot testing of the AORF and Adaptive Reading Comprehension subtasks were conducted by MetCuantus, a psychometrics consulting firm, in collaboration with QFD. EGRA data collected by QFD was validated and analyzed by STS. See QFD's Baseline Report for further details.

[16] Given the low response rate of the baseline parent survey and the fact that most of them answered with the "expected" answer, we decided to ask about parent-child interactions to children.

3.2. Sample

In 2016, *Mundo de Libros* registered 856 children enrolled in grades 1 to 3. All of them were assessed at baseline, either in Round 1 (Jan-Mar 2016) or in Round 2 (Apr-Nov 2016). Round 1 included the children who incorporated at the beginning of the program, while Round 2 included those who were in waitlist or decided to join later. As we will describe in the following sections, for varied reasons not all the registered children were active participants. Regardless of their activity status, most of the registered participants (709) were assessed again at endline (Jan-Mar 2017).[17] Loan activity was tracked for the 513 active users.[18]

In terms of the qualitative analysis, the EQUIDE team visited the 10 selected libraries. They interviewed 40 parents and 24 children on-site during their visits to the library or attendance to the workshops. They also conducted phone interviews with parents of 20 active children and of 52 non-active children. This approach had the objective of having a more representative sample, avoiding the biased of only including those attending the library.

4. Findings

4.1. Quantitative

In this section, we summarize the main activities of the program and provide some descriptive statistics of the sample. We then investigate the potential effects of each of the components of the program on reading skills and habits.

4.1.1. The Program in Numbers

The activities of *Mundo de Libros* during its operation under the ACR grant are summarized in Table 1. Each row in the table corresponds to a library in the sample and the last row shows the aggregate activity level. We can highlight the following:

a. Almost 10,000 books were loaned home during an average of 50 weeks of operation, which amounts to 200 books borrowed per week. A similar number of books is estimated to have been read at the library.

b. More than 850 children signed-up to the program, which is 42% above our initial objective. This shows that the demand for this type of programs exists, even on

[17] The main reasons for sample attrition were: child moved away from the area or switched school, contact information was no longer valid, and lack of time to attend the assessment.
[18] *Active* is define as having at least one loan in the period under analysis.

disadvantaged locations where parent's education is low and commuting time and cost can be relatively high.

c. About 60% of the children that signed up for MdL were active in the program, meaning that they borrowed at least one book. This gives an average of 20 books borrowed per child. Given the lack of access to level-appropriate and good quality reading materials reported by families, both at home and at school, we consider this is an important achievement.

d. A challenge that the program faced with this age group was usage of the website to look for recommendations. This became evident by the fact that only 1,061 logins were recorded, which amounts to only 10% of the number of books borrowed. Nevertheless, we most note that login activity started to be recorded late in the program and was not tracked while the server was damaged. In addition, much of this activity had to be strongly promoted and was not one of the children's natural activities in the library.

e. Achieving family engagement was also a challenge: only one third of the parents participated in the workshops designed to inform them on how scaffold their children reading process. For those that participated on workshops, positive feedback was received (see Section 4.2). Although many parents did not attend the workshops, they engaged by taking the first steps of: bringing children to the library, spending time reading with them, and listening them reading aloud.

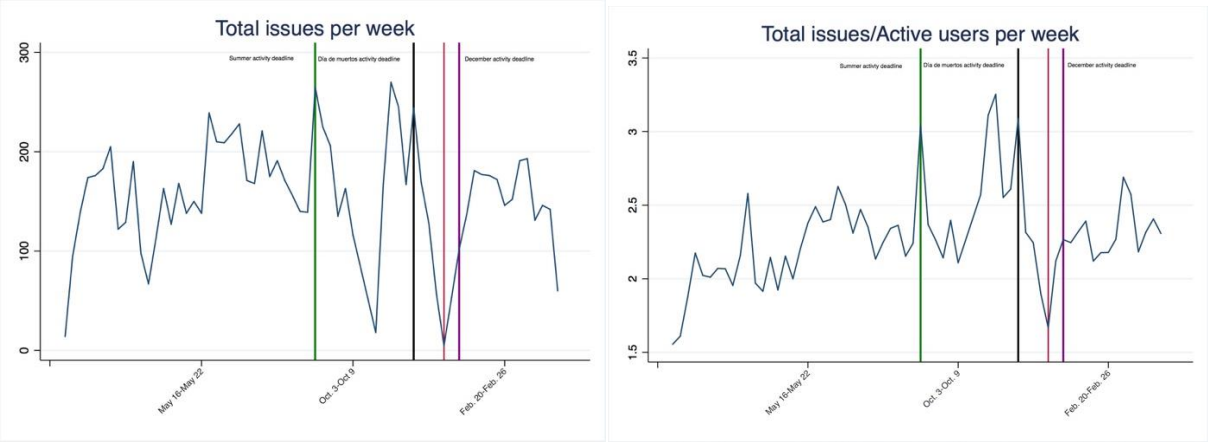
f. There is heterogeneity between libraries: (i) the most active children were those in Tepotzotlan and Zumpahuacan, where each active child loaned on average 26 books and their most active children got to loan up to 54 books in a quarter (ii) the least active children were those in Malinalco, where each active child borrowed on average less than 12 books, (iii) the library with the highest rotation was Atizapan, where each week 46.6 books were borrowed on average, and (iv) the library with the lowest rotation was Ecatepec, where the weekly average of loans was 9.8 books.

Table 1: Activity by library

	Issues	Weeks Operating	Num children	Active users	Total Logins	% Active Users with webpage activity	Workshop Attendance	% Active Users with parents attending
Atizapan	2,376	51	181	119	86	83.72	51	31.93
Chicoloapan	713	51	67	33	100	92.3	18	36.36
Ecatepec	478	49	63	38	107	83.33	-	-
Ixtapaluca	1,288	51	78	56	50	72.73	-	-
Malinalco	544	49	80	46	59	69.23	24	30.43
Nezahualcoyotl	484	49	103	39	46	74.07	32	41.03
Nicolas Romero	1,322	51	99	63	237	85.42	-	-
SMP	1,047	50	75	55	105	61.11	16	20
Tepotzotlan	750	51	29	28	112	95.83	-	
Zumpahuacan	963	51	81	36	159	69.57	-	-
TOTAL	9,965	-	856	513	1,061	78.29	141	32.27

Contrary to our initial expectations, library activity was quite stable with some peaks and valleys explained by the seasonal challenges (i.e. summer, fall, winter) and brief system breakdowns. Graph 1(a) shows that on average, the activity remained stable around a level of 170 books borrowed per week, with the trend being increasing. Similarly, Graph 1(b) shows that the total number of books borrowed per child per week is quite stable around 2.3 and slightly increasing across time. Peaks in activity occurred with the reading challenges designed by QFD and which deadlines are shown with vertical lines. Notably the “Summer” and “Day of the Death” challenges were quite successful increasing loans. Meanwhile, the valleys are explained by vacations, holidays and the server damage, where loan were not appropriately recorded.

Graph 1: Library activity

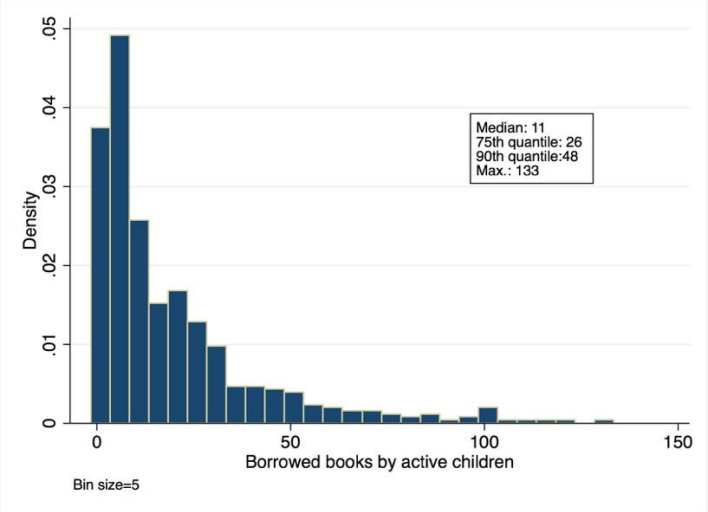


Source: QFD’s calculations with KOHA data

Graph 2 shows the heterogeneity of activity that exists among active children. The histogram illustrates that the borrowing activity is skewed to the right, meaning that most of the children have low borrowing activity. For instance, 75 percent of the active children

borrowed less than 26 books. Some notable examples had more than 100 books borrowed, which averages more than 2 books per week during the project duration for a single child.

Graph 2: Histogram of activity per child



Source: QFD's calculations with KOHA data

4.1.2. Descriptive Statistics

The descriptive statistics for the baseline and endline assessments (EGRA, Peabody, Reading Habits) are presented in Table 2. It is worth noting that the samples for those administrations are not balanced because of attrition. The summary statistics show that the program was quite successful assessing children at endline, even those that did not actively participate in the program. Overall, for the endline, we tested 83% of the individuals assessed at baseline.

In Table 2, the columns of each panel show the number of observations (N), the mean (μ), the standard deviation (σ), the % of zeros, and the % of max. These 2 last columns present the percentage of assessed children that got all items wrong (% zeros) and all the items right (% max), which indicate occurrence a floor or ceiling effect, respectively. The last block of variables shows the summary statistics for 6 questions of the Habits Survey that were collected both, at baseline and endline. In this case the statistics correspond to the answers given to the questions on a 4-point likert scale, where 1 indicates none or never.

Table 2: Baseline and Endline Descriptive Statistics

	Baseline					Endline					
	N	μ	σ	% of zeros	% of max.	N	μ	σ	% of zeros	% of max.	Max. Score
EGRA											
Letter Sound Knowledge right items	856	24.38	15.65	6.07	0	709	30.54	14.8	2.4	0	100
Initial Sound Identification right items	856	5.77	3.57	14.37	16.71	709	6.92	2.89	5.08	19.89	10
Familiar Word Reading right items	856	34.62	17.45	8.41	24.3	709	43.13	11.08	1.13	29.06	50
Non-word Reading right items	856	28.01	14.87	6.89	2.1	709	34.6	11.22	1.41	2.82	50
Oral Reading Fluency right items	856	42.74	21.06	5.49	25.93	709	52.72	12.47	1.13	26.23	59
Oral Reading Fluency questions	856	3.78	2.37	16.71	13.43	709	5.03	1.81	3.67	20.59	7
Reading Comprehension right items (Toto)	220	87.72	17.26	0	27.73	99	85.71	12.09	0	11.11	97
Reading Comprehension right questions (Toto)	220	3.39	1.57	5	10.91	99	3.62	1.43	3.03	7.07	6
Reading Comprehension right items (Rufo)	475	159.13	7.72	0	23.16	584	153.61	24.96	2.4	9.93	164
Reading Comprehension right questions (Rufo)	475	4.28	1.41	0.63	22.11	584	4.32	1.52	2.74	24.32	6
Peabody											
Peabody Score	856	67.45	15.35	-	-	709	75.37	14.87	-	-	
Habits Survey											
How often do you watch TV?	853	2.98	1.04	11.72	41.15	709	2.63	1.15	23.41	30.89	4
How often you see your parents reading?	853	2.69	1.13	22.04	30.95	709	2.41	1.19	32.72	26.38	4
How much do you like reading?	853	3.38	0.97	8.56	65.06	709	3.42	0.9	6.77	63.05	4
How many children books are in your house?	852	2.77	1.15	20.54	36.85	709	2.6	1.16	25.67	29.06	4
How often do you talk with someone in your family about what you read?	852	2.96	1.04	13.85	38.73	709	2.84	1.09	17.23	35.31	4
How often does your parents read you a book?	853	2.88	1.13	18.52	39.39	709	2.36	1.16	33	22	4

Source: QFD's calculations with baseline and endline assessment databases

4.1.3. Program Evaluation

a) Access to reading materials

The design of the project did not contemplate a control group without any treatment (i.e. business as usual) to answer RQ1. Every child in the project was: granted with access to the book stock and the web-based platform, able to loan books, included in the reading challenges, and encouraged to read; the conditions that varied were receiving the MATCH algorithm and the parents' workshops. However, in the interest to assess the overall benefits of the project and answer RQ1, we take advantage of the fact that the implementation included baseline and endline assessments at the same moment of the calendar year. Children enrolled in grades 1 and 3 at baseline were invited to the project and were assessed before the intervention began. Then, after a year of exposure to the program, those same children were assessed again using the same instruments by the time they were in grades 2 to 4.

Trying to assess the impact of the program by comparing the same child before and after the implementation (i.e. comparing baseline to endline) is problematic since it would be impossible to disentangle the effect of the program from the learning that child gained by advancing one grade of schooling. Ideally, we would be interested on observing the child before and after the implementation, without him advancing in his education. Since this is unfeasible, we propose instead to compare the average second grader assessed at

baseline with the average second grader assessed at endline; that is, children with versus without *Mundo de Libros* while on grade 1. Given that assessments are gathered around the same time in the calendar year, with this strategy we have two groups, both with similar schooling, but one was exposed to the project and the other not. The same comparison is possible by focusing on third graders. The groups that do not have a comparable counterpart are: first graders assessed at baseline and fourth graders assessed at endline.

Table 3 shows the results of these comparisons. The results show convincing evidence of improvement in the "letter sound knowledge" assessed with EGRA, which is in the order of 0.19 and 0.32 standard deviations for second and third graders, respectively. For third graders, the evidence suggests that reading comprehension improved as well. In the assessment, children were classified as advanced or basic comprehension level based on Reading Comprehension subtask of EGRA. Their performance on that subtask was used to assign them to the one of the adaptive fluency and reading comprehension exercises. The third graders exposed to the program improved their likelihood of being classified as advanced in 12 percentage points.[19]

Table 3: Endline/baseline comparison by grade

	2nd grade(baseline)	2nd grade(endline)	Diff.	3rd grade(baseline)	3rd grade(endline)	Diff.
Letter Sound Knowledge right items	25.75	28.59	2.85**	26.96	31.22	4.26***
	(15.35)	(14.90)	[1.46]	(13.41)	(14.33)	[1.51]
Initial Sound Identification right items	6.32	6.57	0.25	6.75	7.05	0.31
	(3.54)	(3.14)	[0.33]	(3.17)	(2.85)	[0.33]
Familiar Word Reading right items	40.54	39.41	-1.13	45.43	45.60	0.17
	(12.60)	(12.91)	[1.29]	(9.38)	(8.56)	[1.00]
Non-word Reading right items	31.91	30.34	-1.57	38.17	36.39	-1.78*
	(11.69)	(11.30)	[1.09]	(9.17)	(10.11)	[1.07]
Oral Reading Fluency right items	50.14	49.31	-0.83	55.86	55.38	-0.48
	(15.08)	(15.26)	[1.51]	(8.31)	(8.47)	[0.92]
Oral Reading Fluency right questions	4.67	4.42	-0.25	5.30	5.38	0.09
	(1.95)	(2.00)	[0.19]	(1.60)	(1.43)	[0.16]
Probability of Reading "Rufo"	0.69	0.71	0.02	0.80	0.92	0.12***
	(0.46)	(0.46)	[0.04]	(0.40)	(0.28)	[0.04]
Peabody Score	69.23	68.36	-0.87	76.67	78.28	1.61
	(14.78)	(13.52)	[1.33]	(12.02)	(13.61)	[1.42]
	169	280		138	211	

Clustered standard errors in parentheses
* $p<0.1$,** $p<0.05$,*** $p<0.01$

[19] A negative effect on the "non-word reading" section was also perceived. However, the effect is statistically weak and could be the result of a type-I error, i.e. rejecting the null hypothesis of zero effect while it is true.

It should be noted that only observations of children that were assessed both at baseline and endline were employed. This avoids the possibility that endline children are better, because the children with lower scores did not wanted to be assessed again (i.e. positive self-selection of endline children). Nonetheless, this estimation has some limitations. Mainly, since the same EGRA and Peabody assessments were conducted at baseline and endline, children might remember the questions and might have learned from it.[20] Also, we are comparing assessments at different periods such that if at the endline, the authorities paid more attention, enumerators had better skills for administrating the instruments or for some other reasons the testing was done better, this might positively bias the results.

b) Adequate-level book recommendations

To address RQ2, we start with a simple analysis of the MATCH algorithm and how well it managed to implement book recommendations by matching books to users according to their scores. To do so, we define two "fit" measurements:

$$fit1_i = \frac{1}{N}\sum_{n=1}^{N} |book\ score_n - child\ score_i|$$

$$fit2_i = \frac{1}{N}\sum_{n=1}^{N} (book\ score_n - child\ score_i)^2$$

where $child\ score_i$ represents the *adequate-level* of book difficulty a child should be reading according to his grade and score on EGRA and Peabody.[21]

The first step to evaluate if the MATCH algorithm worked, consisted in doing simulations of webpage recommendations for 100 randomly chosen users (50 on Treatment and 50 on Control). For each selected user, a member of our team logged in with the selected user profile and recorded the first 10 recommendations (N=10) given by the webpage. With this information, the fit measures were calculated. To assess that the webpage recommendations are working, the treatment and control individuals were compared. Table 4 (panel A) shows significant differences between T and C, being the fit for the treatment group considerable better (i.e. significant lower difference at the 1% level).

[20] Given the fact that students did not receive their test graded item by item, some students might remember sections that were difficult or questions that they struggled with and have a better performance at endline. It is also possible that they were less nervous or that at endline they knew what to expect about the test instructions and content.

[21] $child\ score_i$ was calculated using a maximum likelihood method (specifically the *ordered probit model*) by using a combination of the EGRA and Peabody scores, separating children by their grade and ranking them in quantiles according to their combined direct score, therefore the scores for children in first grade go from 100-199; from 200-299 for second grade and 300-399 for third grade.

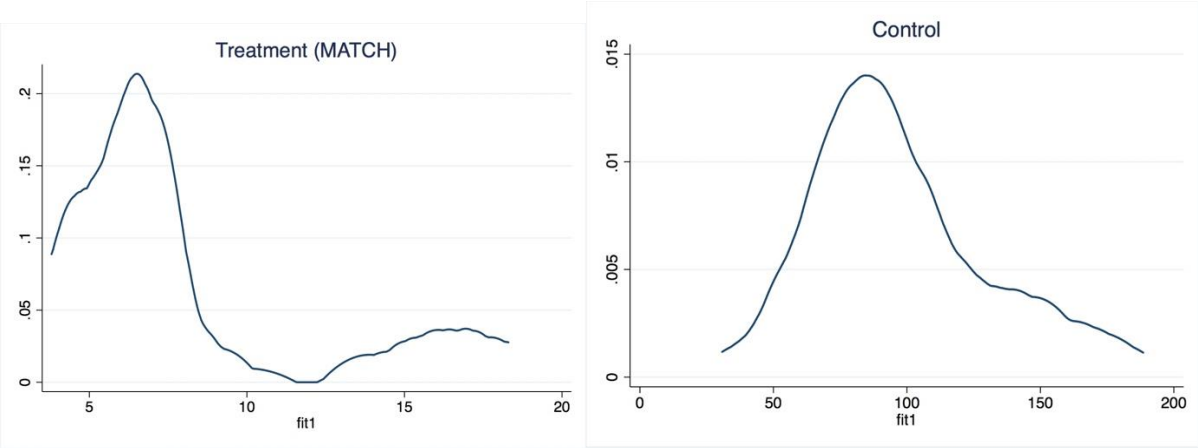
Table 4: MATCH algorithm "fit" measurements: Summary Statistics

	Webpage Recommendations				Loans			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Treatment (MATCH)								
fit1	7.96	4.19	3.8	18.3	102.01	46.23	10.5	257
fit2	270.42	476.13	21.7	1705.8	15135.88	11519.3	166.5	66049
Control								
fit1	97.99	33.8	30.8	188.5	97.36	45.14	6	241
fit2	14363.22	9013.85	1783.8	42825.7	13827.87	11149.03	36	58081
Mean difference:	fit1	fit2			fit1	fit2		
	90.02***	14092.79***			-4.63	-1308.01		

* $p<0.1$,** $p<0.05$,*** $p<0.01$

The previous findings are confirmed by comparing the distribution of the *fit1* measure for the treatment and control groups (Graph 3). As can be seen in the kernel density estimations that were done based on the simulations, the treatment group fit density is much closer to zero and its distribution is skewed to the right, while the control density is quite symmetric and exhibits much higher values for the *fit1* measure.

Graph 3 – Kernel densities for fit1



Unfortunately, better book recommendations did not translate on users borrowing more appropriate books because of low website usage.[22] When comparing the fit measure for books borrowed by individuals in the treatment group to those from the control group, the difference in the fit measures is not statistically significant (Table 4, panel B). This suggests that despite our efforts, the website was not being actively employed to select the books that the children were taking home.

[22] In the next section, we discuss some of the reasons for low usage.

c) MATCH algorithm and Workshop for parents

A design to evaluate the reading recommendations done based on the MATCH algorithm and the parental workshops was implemented from the beginning.[23] The MATCH algorithm was assigned in two groups: a treatment and control that were determined at the individual level. The parental workshops were defined at the library level to avoid contamination.

In this subsection, we present the results from the statistical evaluation of the MATCH algorithm (RQ2) and the workshops (RQ3). We begin explaining the results from Table 5. Two things are worth noting from this Table:

- By looking at the treatment versus control comparison at baseline, no significant differences are apparent for the exercise where MATCH is the treatment variable. As for workshops, only letter sound knowledge was statistically different from zero.
- By employing a difference-in-difference (DD) strategy, we assess the effect of the MATCH algorithm and the parental workshops. No effects are apparent by using this strategy neither for the EGRA and Peabody tests nor for the Habits Survey.

Table 5: Differences between Treatment and Control groups

	Baseline				Baseline			
	μ(control)	μ(treatment)	Diff.	DD	μ(control)	μ(treatment)	Diff.	DD
Ti=MATCH					**Ti=Library with Workshop**			
Letter Sound Knowledge right items	24.79	25.7	0.92	-1.39	27.66	23.67	-3.99*	0.17
			(0.94)	(1.64)			(1.92)	(1.66)
Initial Sound Identification right items	6.14	5.79	-0.35	0.27	6.14	5.85	-0.29	0.06
			(0.14)	(0.35)			(0.36)	(0.35)
Familiar Word Reading right items	34.57	35.69	1.12	-0.62	37.34	33.69	-3.65	1.88
			(1.16)	(1.54)			(2.42)	(1.57)
Non-word Reading right items	28.39	28.78	0.39	-0.4	30.23	27.52	-2.72	0.6
			(1.04)	(1.40)			(2.24)	(1.43)
Oral Reading Fluency right items	42.51	44.3	1.79	-1.76	46.1	41.63	-4.5	2.8
			(1.17)	(1.82)			(2.99)	(1.85)
Oral Reading Fluency right questions	3.86	3.86	0.01	0.01	4.06	3.73	-0.33	0.1
			(0.11)	(0.01)			(0.30)	(0.23)
Oral Comprehension right items (Toto)	87.29	88.83	1.54	-0.52	88.6	87.65	-0.96	2.57
			(3.06)	(3.90)			(3.17)	(3.99)
Oral Comprehension right questions (Toto)	3.31	3.61	0.3	-0.53	3.44	3.48	0.04	-0.04
			(0.24)	(0.39)			(0.24)	(0.40)
Oral Comprehension right items (Rufo)	159.02	159.56	0.54	-2.07	159.36	159.24	-0.12	1.76
			(0.61)	(2.54)			(1.57)	(2.58)
Oral Comprehension right questions (Rufo)	4.33	4.28	-0.05	0.02	4.31	4.3	0	-0.08
			(0.10)	(0.19)			(0.20)	(0.19)
Peabody Score	67.66	68.17	0.51	0.08	69.75	66.72	-3.03	0.5
			(0.84)	(1.61)			(2.14)	(1.64)
How often do you watch TV?	2.94	3.06	0.12	-0.09	2.96	3.03	0.07	-0.06
			(0.07)	(0.12)			(0.09)	(0.12)
How often you see your parents reading	2.66	2.7	0.04	0.04	2.74	2.64	-0.1	0.03
			(0.08)	(0.12)			(0.09)	(0.13)
How much do you like reading?	3.34	3.41	0.06	-0.08	3.39	3.37	-0.02	0.03
			(0.07)	(0.10)			(0.08)	(0.10)
How many children books are in your house?	2.78	2.7	-0.08	0.08	2.77	2.72	-0.05	0.07
			(0.09)	(0.13)			(0.10)	(0.13)
How often do you talk with someone in your family about what you read?	2.95	2.92	-0.03	0.06	2.95	2.93	-0.02	0.06
			(0.12)	(0.11)			(0.07)	(0.12)
How often does your parents read you a book?	2.85	2.84	-0.01	0.21*	2.85	2.85	0	0
			(0.06)	(0.12)			(0.08)	(0.13)

Clustered standard errors in parentheses
. * $p<0.1$,** $p<0.05$,*** $p<0.01$

[23] See Annex B.

The DD analysis exploits the initial design to evaluate the MATCH and workshops components. This analysis details how much more (or less) the treatment group improved between baseline and endline assesments, in comparison to the control group. For instance, the 0.17 value that appears in the last column of the row in Table 5 line would be explained as follows: children in libraries that received workshops improved the number of right items of "letter sound knowledge" on 0.17 items more than children in libraries without workshops.

The previous identification only uses the assignment to treatment and not treatment itself. Since the effects might occur only for those who employ more the project components (i.e. active users), we also estimated some regressions. Tables 6 and 7 show the results from these estimations. It is relevant to highlight the following:

- Being an active participant has a significant effect on “familiar word reading” and, in general, displays positive though non-significant effects.
- Attendance of parents to workshops has the stronger positive relationship with assessment results. Particularly, attendance displays positive effects on most of the EGRA sections compared to not being assigned to workshops.
- Technology involvement seems to be the only important driver to use the website for book recommendations since login in to the website is positively related to watching TV often.

Table 6: EGRA/Peabody score OLS estimations

Endline EGRA subtasks standarized score:	(1) Letter sound Knowledge	(2) Initial Sound Identification	(3) Familiar Word Reading	(4) Nonword Reading	(5) Oral Reading Fluency	(6) Oral Reading Fluency (Q)	(7) Peabody Std. Score
MATCH	-0.04	0.02	-0.00	-0.01	-0.02	0.00	0.00
	(0.02)	(0.02)	(0.01)	(0.03)	(0.01)	(0.03)	(0.01)
active	0.02	0.02	0.04**	-0.00	0.00	0.05	0.02
	(0.04)	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
log	-0.02	-0.01	0.02	0.01	0.01	0.02	0.02
	(0.04)	(0.05)	(0.02)	(0.02)	(0.01)	(0.05)	(0.02)
Wkshp × Assistance	0.04**	0.05**	0.01	0.01*	0.02*	0.02	0.01
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Baseline std. score	0.61***	0.51***	0.41***	0.55***	0.38***	0.47***	0.68***
	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
cons.	0.26***	0.15***	0.21***	0.23***	0.22***	0.28***	0.09***
	(0.06)	(0.03)	(0.02)	(0.02)	(0.01)	(0.03)	(0.01)
N	696	696	696	696	696	696	696
R^2	0.433	0.399	0.443	0.538	0.423	0.403	0.502

Clustered standard errors in parentheses.
* $p<0.1$,** $p<0.05$,*** $p<0.01$

Table 7: Survey answers OLS estimations

	(1)	(2)	(3)	(4)	(5)	(6)
	sa 1	sa 2	sa 3	sa 4	sa 5	sa 6
MATCH	-0.02	0.07	-0.03	0.02	0.03	0.20***
	(0.06)	(0.05)	(0.05)	(0.06)	(0.08)	(0.06)
active	0.08	0.04	0.09	0.14	0.10	0.12
	(0.09)	(0.13)	(0.10)	(0.09)	(0.07)	(0.14)
log	0.19*	0.02	0.12	-0.06	-0.03	-0.02
	(0.09)	(0.13)	(0.07)	(0.08)	(0.16)	(0.09)
Wkshp × Assistance	-0.01	0.01	0.12***	-0.09	0.08	0.11
	(0.04)	(0.10)	(0.02)	(0.10)	(0.08)	(0.07)
Baseline answer	0.28***	0.15***	0.21***	0.25***	0.13***	0.19***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.05)
cons	1.68***	1.96***	2.60***	1.81***	2.36***	1.65***
	(0.23)	(0.16)	(0.13)	(0.14)	(0.14)	(0.22)
N	695	695	695	693	693	695
R2	0.073	0.023	0.072	0.069	0.020	0.050

Clustered standard errors in parentheses.
* $p<0.1$,** $p<0.05$,*** $p<0.01$

Where:

sa 1	How often do you watch TV?
sa 2	How often you see your parents reading?
sa 3	How much do you like reading?
sa 4	How many children books are in your house?
sa 5	How often do you talk with someone in your family about what you read?
sa 6	How often does your parents read you a book?

It should be noted that these results although informative, are not rigorous evidence of the effect of the program.[24] For instance, being active or participating in workshops might be biased estimates since these attitudes might be correlated to positive attitudes, motivation and interest towards reading. In addition, the final sample was too small to have sufficient statistical power to make causal inferences.

4.2. Qualitative

The qualitative component of the evaluation design was crucial to monitor the implementation of the program and to shed light of the findings of the quantitative

[24] A more detailed quantitative analysis is being conducted by STS in a parallel report.

analysis. The external qualitative team conducted observations and interviews at various stages of the implementation of the program. For this, they visited the libraries, observed assessment administration, attended some of the parent´s workshops and other events. The team complemented face-to-face interviews with phone interviews to reach both, active and non-active, members of program.

In this section we describe, based on the reports from the external qualitative team EQUIDE and the QFD's staff experience, the main qualitative observations.[25] We group the main observation of the qualitative evidence into 3 broad components of the program.

4.2.1. Access to Books

A key issue for the development of early literacy is to get books in children's hands so they can familiarize with them and practice their new skills (Neuman, 1999). Many studies have documented the disparities in literacy environments for children of distinct socio-economic status. Growing in a poorer home literacy environment has been linked to lower reading knowledge and skills at school entry (Nord et al., 2000). Children from low-SES families are often at greater disadvantage than those from middle and high-SES since they tend to have limited access to reading materials at home –less exposure to a variety of genres and topics—and most their access happens at school (Lindsay, 2010; Krashen, 2012). Consequently, for low-SES children this translates into fewer less parent-child literacy around books, less opportunities to develop their vocabulary and reading skills, and fewer chance to learn about the world. Since ensuring that children have easy access to reading materials year-round is a necessary step for promoting reading and developing reading skills (Allington & McGill-Franzen, 2009), this project sought to grant free access to a variety of books that early grade could take home. The qualitative team reported that the average number of visit per week was of 2, and the average books loaned per visit was also 2. But, some children go daily and other go only once a month or take long breaks between visits.

a) Library corner

As mentioned before, the program Mundo de Libros was implemented in 10 *bibliotecas digitales* located in rural and urban marginalized areas. Each reading corner was equipped with bookshelves, chairs, table, bench and had an initial book stock of 751 books (284 titles) of different genres and difficulty. Overall, active children and their

[25] Quotes included here were translated by QFD's team from EQUIDE's report.

caregivers reported being *happy, satisfied,* and *grateful with the program*. Parents considered that MdL was a fantastic opportunity for their kids to have access to a *“varied stock of nice and good quality books”* which *“they can´t find at the school and they can´t afford to buy them.”*

Interviewed parents, from these vulnerable settings, acknowledged the lack of books at home and had a positive perception about the program. Children and parents also value the quality of the available books and the fact that they could be loaned home.

> *"I like Mundo de Libros, well, for me was an option to having books at home. I can´t afford to buy them. You know, if you buy a book they read them and then they don´t read it again." [Parent]*
>
> *"At home, we have other materials and books that doesn´t have drawings. They are not as attractive to them." [Parent]*
>
> *"They are very expensive books. They are very pretty, beautiful and I as a parent I can´t sometimes afford buying this kind of books." [Parent]*
>
> *"I like that I can take books for some time, they are many fun stories" [Child]*
>
> *“(,,,) there are many books that I can take home to read.” [Child]*

Regarding the book stock, at the beginning children thought there was a good variety but as they read, they felt they needed more titles and more topics. Parents since the beginning exposed their interested in having more books to meet the demand and to reach younger and older kids.

> *“I would say to bring more books for younger kids. There are many nice books but I would like to see more.” [Parent]*
>
> *“The quantity of books is good but it would be, well, we have not yet read all of them but when we finish reading all I hope there are new books.” [Parent]*
>
> *“I would like that it had more books like the ones that I like.” [Child]*

Exposure to reading materials is known to benefit reading habits. In that sense, most of the parents reported an increase in their children interest for reading and even a change in their own habits.

"I like to see him reading, he connects with the book and won´t let it until he ends. He is into the book, into the characters and into everything that has to do with the story." [Parent]

"For me, as I mentioned, it has been great because my daughter didn't like to read. But, when she got her passport and realized that she could take books home, a curiosity for reading awoke in her." [Parent]

"The habit has been developing since they entered Mundo de Libros, that is, we started reading more." [Parent]

"Before the program, I preferred to make handicrafts, to knit; I don't know, I liked that. But now with all the homework I left knitting, I see the books, little and nice, and they catch my attention as if I were a child and I also start reading the books, I read them in the blink of an eye." [Parent]

Parents of active users also mentioned seeing an improvement in their children's reading skills, like fluency. Some have noticed a change of attitude towards reading on their children.

"She reads without stopping. She stills gets stuck with some words but when I compare her with other kids in her classroom, I realize that she reads better than them." [Parent]

"Now she has initiative to read on her own (…) Even at school they tell me 'your child has greater fluency' or 'she can read better the words' things like that." [Parent]

Other parents consider that improvements are mainly due to school-related activities or the child's maturation process: *practice anywhere makes a difference*.

"He has improved a little (…) but it is like with any book, no? with practice he develops such skills or stops making the same mistakes."

"When she got her passport, she didn't read anything. Now, she reads better. But also, they teach her at school."

Seasonal reading challenges –during summer, fall and winter—sought to further motivate children to read and see it as a fun activity. Each kid that completed the challenge received a prize (like books, coloring books, sticker, etc.). The activities were promoted

with posters at the libraries, so the information reached those that attended to the library regularly.

> *"[During the special activities] my kid was very motivated, he made a big effort to do the challenges. When he earned the prize, he felt very motivated to read more." [Parents]*

Librarians have positive perception about the program. They reported that having physical books and a reading space is important for the members of the library and has spillovers to groups beyond the targeted age.

> *"For me the most important input of Mundo de Libros to my library is that kids that come to the library -even if they are not members of the program- are more into reading. When they arrive to the library they read." [Librarian]*

Access to books at the libraries seemed to represent a wonderful and inclusive experience for children with disabilities.

> *“When he reads, he has a very emotive shine in his eyes. It seems that he travels with his mind, he likes to retell –in his own way—the stories, and… it even appears like he feels like a normal boy and forgets his pain. Books are his friends.” [Grandmother of an orphan boy with autism]*

> *“She forgets her difficult medical situation and really gets into the books. I have noticed other changes in Adela. Her teacher says she has improved a lot (…) She has a medical device in her back so she can walk; it is very painful and sometimes she prefers not to walk. But, when I say we are going to Mundo de Libros she puts her device on without complaining (…) When she reads, she forgets about pain, she enjoys also the drawings.” [Mother of girl with a physical disability]*

In addition, the program had positive externalities for other family members and BD’s children. Although book loan was restricted to MdL members, any person could read books on site. It was common to visit libraries and find kids that were not in the program reading books.

> *“He is a 5th grader that likes to come here and read while his brother takes on of our courses.” [Librarian]*

b) Librarians

Creating libraries with a large and high-quality stock of books is not always enough to foster child's motivation and interest in reading. For instance, librarians can play a key role promoting reading through different activities beyond arranging books and processing loans/returns. Libraries without librarians are only a group books. Throughout the operation of MdL, we became more aware of the difference that an active and committed librarian can make in terms of children participation. Recognizing the importance of librarians, we next describe their role in the program in terms of the access to books.

Librarians oversee the daily operation of the library that goes from customer service to arranging the books stock. In our case, librarians had not professional training in this area, they are Proacceso's staff (known as facilitator or assessor), who were used to the normal activities of the BDs, such as conducting courses and lending computers/tablets to users. Nevertheless, librarians have been crucial for the operation and proper functioning of the program. Acknowledging this, QFD trained them and provided constant support on the operation of *Mundo de Libros* (i.e. registration, arranging stock, library system platform, book loan and return, website use, etc.).

It is important to note that MdL was only one of the multiple activities they must carry out as part of the normal operation of the BD. Besides their *Mundo de Libros* responsibilities, each facilitator has other tasks/goals assigned by Fundacion Proacceso. To compensate for the new responsibilities associated with MdL and motivate them to commit, during this stage of the program they received an economic incentive based on performance. The problem with this was that, due to the administrative process, some payments took a while to be paid to librarians, making it difficult for them self-evaluate their current performance.

According to the external qualitative team, the general perception of the librarians of *Mundo de Libros* is positive. They acknowledged that *Mundo de Libros* changed their normal work dynamic. For instance, some reported that the program attracted new members and increased the number of visits to their libraries.

> "*For the library, Mundo de Libros brings a lot. This year during mornings we had parents reading small kids. Also, high school kids using the reading area." [Librarian]*

"I like a lot the program, it helps us have more kids and parents. We can invite them to our other activities. Mundo de Libros has been a good addition to our site." [Librarian]

During the implementation of program, we had some librarians very motivated with the program, who were even reading the books. Librarian's attitude and availability was very important for the member's involvement and participation. One of best examples of the positive influence of an active and motivated librarian was the loan activity in the libraries with the most active librarians (Nicolas Romero, Atizapan), as can be seen in the quantitative section. The qualitative team also attributes the unequal commitment of librarians to a misunderstanding of the program and their responsibilities; it was tricky to have a somehow external program which rules did not depend directly from their employer and there were tasks (like the assessments) in which where not included.

One of the main challenges we faced regarding the librarians was rotation. In this stage, some librarians (7 out of 20) switched to another BD or stopped working there. This situation demanded training for the new librarian on the operation of this and other programs. Sometimes it took a while for the new librarians to learn about the program and a get use it. In a couple of libraries, we saw that this change of staff influenced the level of activity in *Mundo de Libros*. For example, number of users and loans decreased considerably in Malinalco after the summer, almost at the same time one of the head librarian left.

Before the program started operating some of the librarians explained to us that one of the main challenges for the libraries was bringing new members. Although we tried building links with nearby school, this challenge continued along this stage of the program. Even if we had many applications for the program, many members never became active. Also, some active members at some point stopped attending frequently.[26]

"One problem we are facing in the library is that our active members are few. The same members are the ones that always come. I suggest that we should contact parents and make an invitation to assist to the library." [Librarian]

c) Family Context

The main reasons for lower visits to the library seem to be directly linked to the factors different from the operation of the program: time availability, distance and family logistics. Distance was a recurrent factor for non-attendance. In some of these areas, public

[26] This is explained before at 4.2 Attendance challenges.

transportation is limited or not efficient to make the journey to the library. For some, going to the library was time consuming and/or expensive if they needed to take a taxi.

> *“We wanted to go but then I had an accident y and could no longer take him to the library. It’s close to school but about 40 minutes from home.”*

However, some parents value the program and make an extra effort to go for books to the library.

> *"The library is quite far away, we need to walk more than half an hour, and there is not public transportation that gets there. When she wants to go, I make the effort and take her."*

One of the key factors to understand the attendance to the libraries was parents time availability. Many parents reported that it was challenging to find time to take children to library while meeting other responsibilities. Some parents have full-time jobs and others have different activities (e.g. extra-curricular courses, therapy) with their kids.

> "*For me it was very difficult to go to the library. In the morning, I take one of my kids to school and in the evening, I take the other. So, I am in a hurry all day long. The library is a little far away from home." [Parent]*

> *"Sometimes it was hard to visit the library, I am a single mother so I have other duties. I sent her with someone I trust, an aunt or with my sister, her daughter also is member so they come together." [Parent]*

In the settings where selected BDs operate, many parents of participating children worked during the day. This complicated the logistics to attend the library. In some cases, like Nezahualcoyotl, grandparents or other family members were the ones binging the kids to the library. Despite that, the ones in charge on reading with children were mainly their mothers.

> *"His parents are working so I am the one taking care of him and his 2 brothers after school. I bring them to the library once or twice a week but they say that read at night with his mom.” [Grandmother]*

> *“I had to work and I couldn’t bring her.” [Grandmother]*

Regardless of their interest in the program, some families faced situations that make difficult regular attendance to the library.

"Yes, she got her passport and like to go, but we didn't return because I was pregnant and then had my baby." [Mother]

"We stopped attending because she had some problems at school… I had to take her to a Psychologist, sometimes at noon. I didn't have time to bring her to the psychologist and the library." [Mother]

d) Community Context

Other factors contextual factors determined the attendance to the library and therefore, access to reading materials: weather and security. Weather was a relevant a factor, particularly during the raining season. Rain combined with poor public transportation services make it very challenging for parents to take kids to the library. This seems to be reflected on the decrease of loans on those months. During our visits to the libraries in raining season the QFD staff noticed that some of the libraries' neighborhoods got flooded and even one library had water filtrations that damaged a couple of books. Some children mentioned they were afraid of taking home a "*book because it could get wet during the journey*".

Security is a growing concern in Mexico. By chance, some of the selected libraries (like Ecatepec and Ixtapaluca) are located on unsecure areas with high incidence of robberies, assaults, etc. Despite that, the qualitative team noted that libraries were perceived by parents as safe places, where access to the site was monitored by a security guard. Nevertheless, travelling to the libraries in some cases implied crossing unsecure neighborhoods. The insecurity of the neighborhoods has not stopped many for continuing in the program since they report that the joy of observing their kids progressing in different areas is a huge motivation to continue in *Mundo de Libros*.

"The BD has a closed and secure space for our children." [Parent]

"We get a taxi to come, we don't want to walk because we are afraid someone might steal the books." [Child]

4.2.2. Interesting and Adequate-level Books

Research has shown that books tailored to a child's reading level allow him/her to improve his/her current reading skills and expand his/her reading strategies (Fountas & Pinnell, 1996). Children benefit the most from books that match their interests and skill level –are engaging and challenging but not too difficult (Allington, 2002; RAND, 2002). Books that

are too difficult can produce frustration, while those that pose little challenge can lead to boredom (Routman, 2003). Nevertheless, children without guidance tend to initially choose books that are visually appealing even though they could be difficult for them to read independently.

Recently, different methodologies have been developed to match students' reading abilities to books' text complexity level. Readability formulas used for book-leveling frameworks have been developed in some languages, mainly English. Frameworks like Lexile, ATOS, DRA, and Fountas & Pinnell are widely used in schools throughout the U.S. to determine a range of the reading materials that are appropriate for students. Underlying readability formulas are usually based on text's characteristics that can be measured objectively (e.g. sentence length, word length) but few formulas consider also less objective characteristics (e.g. abstraction, illustrations).

The main limitations of book-leveling frameworks are their focus on the English linguistic structure and their broad level classifications, or none, for early grade readers. The adaptation of these frameworks to different phonology, orthography, and syntax structures, such as Spanish-written texts, is not straightforward. Recent efforts have advanced creating book leveling versions for Spanish-written texts. Still, most of the books classified are not available in less developed countries and the leveling frameworks have only been tested within a context of English Language Learners (ELL) in US schools. In addition, adaptations consider mostly easily quantifiable measures, such as word length, that not always enough to address all features that affect beginning readers (Mesmer, 2008), like illustrations that compensate for text difficulty.

Recognizing the importance of book selection, one of the component of the *Mundo de Libros* program is access to adequate-level book materials. The match between readers and books is defined by QFD through an algorithm (known as MATCH) that considers both, books' and readers' characteristics. On the book side, it relies on quantitative and qualitative parameters relevant for the linguistic structure of Spanish-written texts. The quantitative characteristics of each book (e.g. word length, sentence length, paragraphs per page, etc.) are determined from the capture of the text; while the qualitative characteristics (e.g. structure, content, format, content, etc.) are defined through a rubric, filled by a literacy expert. On the child side, the algorithm considers a composite score of vocabulary and reading skills measured by the previously described, TVIP and EGRA assessments. The MATCH algorithm operates through the program's technology-based platform (www.mundodelibros), where children in the treatment group see book recommendations ordered according to the adequacy to their reading level. We recognize

that the development algorithm has areas of improvement so the QFD team will continue working, beyond the ACR grant, on producing better fits between the readers and books.

An additional concept to be considered with the selection of adequate reading materials is the element of choice. Research suggests that selecting “what to read” is a major part of becoming a reader (Ollman, 1993) since intrinsic motivation at primary entry age is a strong predictor of subsequent motivation and academic achievement (Gottfried, 1990). That is because, *choice* gives students a real purpose for reading, rather than perceiving reading as a homework or obligation (Harmes, & Lettow, 1986; Ohlausen, & Jepsen 1992).

Some children might be able to read difficult books that are interesting for them. Thus, allowing readers to choose what they want to read is key to foster intrinsic motivation, engagement, and enjoyment of reading (Johnson & Blair, 2003). Even with teacher and parent guidance, children tend to turn to books that reflect their interests and are appealing to them (Johnson & Giorgis, 2010). Therefore, allowing readers to choose books within their reading level is assumed to have greater impact on reading outcomes. Acknowledging this, the internet-based platform also gives users the possibility of filtering books by topic/category of interest and to search by key word and author. Since choice is very important, *Mundo de Libros* gives recommendations trying to guide book selection but does not impose any book (i.e. children are free to loan any book they want).

a) Technology

As we mentioned, *Mundo de Libros* incorporates an Internet-based platform that operates the library system (i.e. loans, returns, profiles, etc.) and runs the MATCH algorithm to give adequate-level recommendations to those in the treatment group. The librarian module was fundamental for the efficient operation of the loan/return system. Meanwhile, the children module was the tool to provide adequate-level recommendations of books that were physically available in the library corner, but it was not seen as a mandatory step to have access to books as would have been the case for digital books.

Children reported that they liked the design of the website but were not clear about its purpose. They reported that their favorite activities were choosing an avatar, rating the books they had read, and searching for new books. It was found through the interviews that the book recommendations were something valued by parents because they helped them finding books that are “good” for them.

"Search filters also help them a lot because if they choose a book of animals, then you can find all the collection, and he was like that, he like one and then searched for all the collection." [Parent]

"The most helpful part of the website were the recommendations. Sometimes that we don't know which other book; he like to read a book that he likes, over and over again; then, when he sees other recommendations of animals, sports, places, it is easier to stop reading the same book and try a new one." [Parent]

Children also gave positive feedback about the recommendations, with comments like *"Yes, I like them", "they are good"* or *"they are ok."*

"Have you read some of the recommended books? -Yes, 'El hijo el Grufalo'
Did you like it? Yes
How many stars did you rate it with? All of them (5)" [Child]

Although children and parents value the *Mundo de Libros* website, they see it as an interesting "extra tool" rather than a key component of the program. This, combined with other factors such as technical difficulties, digital literacy, and time availability, resulted in a low usage of the technology-based platform. The qualitative team explored the reasons for low website usage and worked with QFD on some adjustments. The main reasons were: promotion and perception of relevance, digital literacy, technical difficulties, and time.

"In the webpage he rates books, sometimes he searches for recommendations. But most of the times he goes directly to choose book from the bookshelves." [Parent]

- ***Promotion and perception of relevance***

The lack of promotion and the lack of knowledge about the relevance of the platform were reported by the qualitative team as the main causes for the low usage of the website. Website use was not established as a mandatory step of the book selection process so many of these early grade readers preferred going directly to the bookshelves to handle and choose books.

In some libraries, loans started on January 2016; however, the platform module for children was not launched until April 2016. QFD was still working on the algorithm and ZENIT[27] on its operability. This created and undesirable dynamic (for the program's

[27] ZENIT is a website developer firm subcontrated by QFD to design and develop the *Mundo de Libros'* website with the library system.

purpose) in which children started choosing books directly in the bookshelves without seeing recommendations on the platform.

> *"At the beginning, we didn´t knew of the webpage. The librarian told my kid: `Did you rate the book? ´ And we were like `What?' She explained how to log in and now she uses it." [Parent]*

> *"I didn´t knew about the webpage until now the teacher at the workshop explained to us." [Parent]*

The approach was different during the second enrollment round (2nd semester of 2016) when the children module of the website was already working and made it easier to promote it. To improve the situation described above, the distribution of passports in this round was complemented with an explanation about the website's children module and practical training regarding its use.

> *"The day we went for the Passport, they told us how to use the website to rate books, choose the avatar to see the recommended book to continue reading." [Child]*

> *"She (the librarian) was the one who commented that is was not only reading them, that we also go into the website, rate them, choose an avatar with whom you identify. And then with that it told, more or less, what books to read." [Parent]*

It seems that there was heterogeneity in the quality and timing of the explanation given by librarians to users regarding of this the platform. In addition, not all of them were proactive promoting the website and solving doubts. Despite QFD's efforts, not all the librarians grasped the relevance of the platform in the book selection process and did not motivate its use. Some parents recalled hearing from QFD staff about the webpage when they brought their children for the passport but they did not get more information after that. Others did not know of the webpage until they attended one of the parent workshops given by QFD staff. Also, some parents said they did not know at all about the website. It seems that the value of the website was not seen by many librarians and users. Unfortunately, part of the problem was that QFD could not emphasize the role of adequate-level recommendations because those participants in the control were getting random recommendations and could raise doubts and confusion.

> *"Mmmmm no, no they haven't told us anything about it" [Child]*

"I didn't know the username and password. The psychologist who gives the workshop helped us with those doubts." [Child]

"The teacher (workshop) just explained us how to use it." [Parent]

Most of the parents, knowing or not the website, coincided that this tool was positive for children because they like technology and thus, reading becomes more attractive. But, some believe that there were not motivated enough to use the platform.

"Well, maybe they were never told something that encouraged them to use it." [Parent]

"I prefer to use the computer to play or watch videos, I can choose books on the shelves." [Child]

It is relevant to note that QFD started tracking login activity (i.e. website use) late in the program implementation (May 2016). Acknowledging the low usage of the website, QFD tried different strategies:

- Designed a poster that gave a simplified explanation of how to use the webpage. It was pasted in each library
- Had a meeting with all the librarians to emphasize the importance that children use the website to see adequate-level recommendations.
- Reminded parents, who attended the workshops, about the importance of the use of the platform
- Designed special activities, labeled as seasonal challenges, which asked to complete activities that required the usage of the website.

"I think he has opened the website because it was required as part of a challenge." [Parent]

- ***Technical difficulties***

The development of the platform took almost a year and when it started to be implemented it was not problem free. QFD has been constantly working with Proacceso and ZENIT to overcome problems, some were easily solved but others took longer than expected to solve. Since the platform runs on KOHA, an open-source library system adapted to meet the specific need of the project, any change in KOHA had implications for the platform.

On the BDs' side, we faced challenges because of: the use of Linux instead of windows, existence of Internet balancers that logged users out of the session when jumping from

one Internet signal to another, and centralized browser updates that did not match the current KOHA requirements. On the platform side, we were working with ZENIT on constant improvements; the last being adding a parent and teacher modules. An unfortunate event was the damage of the server on which the platform was hosted, some KOHA codes were damaged and finding the problems and reprogramming features of the website and library system took almost 2 weeks.

Those who have used the website reported that it is helpful and attractive, but they differed regarding the easiness to use it. Parents and kids mentioned encountering difficulties when accessing and exploring it. Librarians and users commented that some of those problems changed the book selection dynamics and reduced children's motivation to use the *website.*

> *"When the system was not working, we had to keep track of loan in an excel which is less efficient and kids couldn't enter the website." [Librarian]*
>
> *"Yes, I have used the website but it has problems. It doesn't let me rate books (…) Other times we read books and in the computer, it says that we haven't read. That bothers me." [Child]*
>
> *"The website has had problems (...) For us it has not been an impediment to loan books. When my son found that the website was slow or not working he started going to the bookshelves to read the abstract from the back of the books he knows where to find them and chooses the book that interest him in that moment." [Parent]*

- ***Digital literacy***

Participants required basic digital skills or help from an adult to use the website. If a parent or caregiver (e.g. grandmother) did not know how to use a computer, then they did not promote or supported the use of the website. Older kids, who were more likely to know how to use a computer or tablet, needed less adult assistance. Unfortunately, given their large amount of responsibilities, the librarians were not always able to help users with low digital skills outside the scheduled courses.

> *"We don´t use the web page because I don´t know how to use the computer and I haven't brought her (daughter) to learn." [Parent]*
>
> *"Yes, the librarian told us about the website but I told her that I don't know how to use it. She told us what to write in the internet and I don't know what we could*

search there (…). We haven't looked at it because I don't know how to use a computer and my daughter at that time didn't know either, just know that she is in third grade I took her to the computer course." [Parent]

However, low digital skills were not a limitation for proactive participants who looked for ways to overcome this limitation.

"I became aware that using a computer was important and I didn't know how to use them. I registered to a class here to learn and help mi son." [Parent]

"Well, I attend here and I am learning (…) to help him with homework he has to do. I download information and search." [Parent]

"I didn't know where to put the address so I asked my older brother." [Child]

Another factor that influenced the use of technology was access to electronic devices (computer, tablet, smartphone) and Internet outside of the library. Nonetheless, a couple of children mentioned checking the book recommendations at home.

"Now, I no longer like to use it because my computer is too slow (…) and I would have to see it here (BD) but sometimes we cannot come or do not have enough time to see it." [Child]

"I worked in the next building but my home is far way. My daughter chooses the books at home and tells me which I need to bring to her." [Parent]

"I make the list of books I want to loan at home and when I come I go directly to the bookshelves with my list." [Child]

- ***Time***

Time was again mentioned as a key factor for active participation. In the case of the platform, some kids reported that they liked the webpage but they lacked the time to use it.

"Since we go in a hurry to the library is hard to use it before going directly to the shelves." [Parent]

"We come just after school, I give him 5 minutes to choose a book, and then we leave to continue with the rest of the afternoon activities." [Parent]

> *"It takes too much time to go into the website to choose only 1 or 2 books and sometimes the internet is very slow." [Child]*

Also, time constraint was a reason why children could not learn about the website and its use, and why librarians did not offer enough assistance for its use.

> *"We couldn't come the day they distributed the passports and I think that is when they explained the website. I saw the poster but still haven't have the time to try it." [Parent]*

However, some children found the way to overcome their time constraints when visiting the library.

> *"We usually only come for books but the other day it was raining so we stayed longer. I logged into the website a wrote a list of books I want to read. Then, I do not have to enter the website each time I come, I just bring my list." [Child]*

b) Choice

As we mentioned before, choice is important for intrinsic motivation and developing good reading habits. For most of the participants in the program, reading was perceived as a "school homework" and books they had to read was a sort of imposition in which they had little saying. When the program began, children had the opportunity to choose books that met their topic preferences.

The qualitative team detected that, in *Mundo de Libros*, choosing books was a subtle negotiation between children and their parents. During the first months of implementation, parents reported that they "*preferred that their kids read big books and that they read a different book each time."*

> *"I don't help she choose because all the books I like she doesn't like them. She tells me, 'No, no, this looks better'." [Parent]*

> *"In the books selection, I don't get involved because he doesn't let me. I tell him 'take this' and he says 'no, no' (…). A couple of times he lets me choose one" [Parent]*

After the workshops, parents affirmed that they have learned to let their children choose their readings. Book choice was a topic implicitly taught in all the workshops; we wanted

to increase motivation in reading by letting them choose by their interest and no because the teacher, parent or someone else enforced reading one specific book.

> *"Sometimes we choose together [the books] sometimes I leave him choose what he wants. Sometimes he wants to read one book more than once, that´s when I interfere and told him `read another one, maybe you also like the new one." [Parent]*

> *"I let her choose by herself, I only help her once, but she didn´t read those books, I read them. [...] So when we come to the library I just tell her to return the books and choose the ones she is taking home." [Parent]*

Some of the librarians have being helpful on explaining parents that is very important that kids are able to choose by themselves. In some extreme cases, parents reported that the librarians did not allow them to enter the shelves area of *Mundo de Libr*os so that kids feel totally free to choose.

> *"There is a girl that comes with his uncle and we have some problems with him because he wants to choose the books for her. We have told him that she needs to choose by herself, he is not very receptive." [Librarian]*

> *"She is the one that chooses, she is the only one that can enter the books area, so she chooses." [Parent]*

4.2.3. Family Engagement

Research has emphasized the crucial role of family in supporting acquisition and improvement of their children's reading skills (Snow et al., 1998). Children from low-SES families are often at greater disadvantage since they tend to have limited access to reading materials at home and their parents usually lack information on how to support their reading development. Growing in a poorer home literacy environment has been linked to lower reading knowledge and skills at school entry (Nord et al., 2000).

Family involvement and access to adequate reading materials have proven to be fundamental for the development of reading skills and good reading habits, especially among emergent and beginner readers (McGill-Franzen, 1993; DeBruin-Parecki, 2006). Parental involvement has been related in previous work to academic performance, school readiness (McNeal, 1999), and both social and emotional development Bredekamp, & Copple, 1997; Fantuzzo, & McWayne, 2002). Performing simple activities, such as reading to young children is associated with better vocabulary development and superior

later reading skills (Snow et al., 1998). However, in several contexts parents have reported being unsure on how to help their children learn (National Commission on Children, 1991).

a) At Home

Early grade students depend highly on their parents or caregivers to take them to the library. If they cannot bring them to the library, they cannot take advantage of the program's book stock and resources. That is, access to reading materials does not happen. Because of *Mundo de Libros*, many families changed their daily routines and parents made an effort to take their kids to the library. For some parents, it became a habit to visit the library and read at home with their kids.

> *"She didn't like to read. Now, we walk almost every day for books. Since she began to eat one book after another, her comprehension has improved." [Parent]*

> *"Visiting the library has become a weekly familiar activity. My mom and I share a taxi to bring our kids in the evenings to the library." [Parent]*

Access to books created opportunities for family members to engage in their kids' literacy activities. Reading is an activity that favors sharing time together.

> *"Reading has made us share time together. We are 5 members in our family, sometimes while reading he laughs, so we ask 'what are you laughing about?' And my husband and I get involved." [Parent]*

> *"I get involved, I sit to read with him, sometimes he does not understand (the content) or one word is very difficult so I help." [Parent]*

> *"I let her read half a book and I read the other half (...) she likes that there is someone listening, paying attention to her." [Parent]*

Mexico society is still very male-oriented so mothers are more involved in parenting activities than fathers. Mothers are the ones that usually read with their children and the ones that take them to the library. Fathers are not involved in reading mainly because they work all day or because they rather do other type of activities with their kids. The qualitative team reported a higher engagement in children's reading activities among mothers. With some exceptions, few fathers went with their kids to the library and read with them at home.

"No, their dad doesn't read, he prefers to do other things with them. She (daughter) also gets bored with him (dad) and takes out her book to read on her own. She has now her routine and reads whether he dad is around or not… She is not like "dad come to read with me' because she knows that he doesn't like it". [Mother]

"I read a lot, dad is most of the time working and when he gets home at night there is little time to be with them. He does give them quality time but I am the one reading at home, taking the book…" [Mother]

"Yes, my spouse and I read to our kids, one to the boy and the other with the girls. If not, we hear them reading aloud Reading a book or the bible. Then we make questions to check if they are understanding." [Father]

The qualitative team reported that the program had benefits for other family members (i.e. spillovers). Although in most of the cases only one child of the family was member of *Mundo de Libros*, due to the program school grade restrictions, other children at home got to read the books or listen to them. We believe there are positive externalities to other family member but, unfortunately, we are not able to measure them.

"I read aloud the books to my grandfather." [Child]

"I have to kids. The one that is in the programs enjoys reading the books to his younger brothers who does not know how to read. The little is very curious and keeps asking 'what's next?'. The old one feels like powerful when reading to his brother." [Parent]

b) Workshops and Materials for Parents

Acknowledging the relevance of engaging parent´s and caregivers in their children literacy, we offered bimonthly workshops in 5 of the 10 libraries.[28] Assignment to this condition was determined randomly and, as it can be seen in the quantitative analysis, by chance participants on libraries with workshops were, on average, are slightly different from those without workshops in some characteristics. The main objectives of these workshops were to: (i) promote parental engagement, (ii) provide information and strategies to scaffold their children's reading practices, and (iii) advise how to create a rich literacy environment at home.

[28] The libraries that had workshops were: Atizapán, Malinalco, San Martín de las Pirámides, Nezahualcóyotl and Chicoloapan.

One of the main challenges we faced regarding workshops was the low attendance. *Time* was again reported by parents as a key factor for participation; most of the parents have full-time jobs or other activities that difficult attendance. Some librarians commented that parents need the right incentives to attend, like making workshops mandatory.

> *"I came to the second, I was out of the city when the first one took place and couldn't make it. And to this [second], they invited me and I could come." [Parent]*
>
> *"I couldn't come because I was working." [Parent]*
>
> *"Parents would always have another priority that is more important than reading, like sports or other activities (…) it's necessary to make it mandatory for program participation." [Librarian]*

In addition, the main communication channel to inform parents about the workshops were the librarians, who in some cases did not compel with this task. Therefore, parents that did not visit the library during the promotion of the workshops were very unlikely to know about them. To prevent this selection problem QFD also phoned parents to tell them about the workshops but in many cases available phone numbers were no longer working.

> "*To the first workshop I didn´t attend, I didn´t knew about it." [Parent]*
>
> *"I have not been invited to any, I think the first one took place before I registered my son." [Parent]*

Overall, reaching parents was challenging because we mainly depended on librarians, posters or phone calls. The phone calls were not very useful as many phone numbers changed and for security reasons many parents did not feel comfortable receiving phone calls regarding the program information. Trying to reach parents and caregivers that could not attend the workshops, QFD left copies of the workshop's materials in the library corner. Unfortunately, we were not successful tracking who picked up the materials as many parents did not fill in the list and librarians did not tracked this.

To increase the attendance to the workshops, QFD tried different strategies: (1) offer activities for children while parents were in the workshop; (2) distribute prizes of the "seasonal activities" to the kids during workshops; (3) hold a workshop in which parent and child could interact; (4) design attractive posters to invite parents; (5) hold workshops in different schedules and days. These strategies seemed to have negligible impact on attendance, which appeared to be mostly driven by external factors that we could not regulate, like job, family logistics, weather, etc.

“I asked Luis [the workshop leader] if for the next time we could bring the kids because there have been kidnaps in the area.” [Parent]

“I didn’t come to the last one because I had a doctor’s appointment.” [Parent]

In addition, the qualitative team reported that there was a misconception of the objective of the “workshop” as some parents thought it was a workshop for teaching them how to read. Consequently, QFD tried to be more specific about the topics and the goals of the workshops, and even change the name of the last “workshop” to “rally” to suggest relaxed and fun activity.

Most of the parents that attended the workshops reported to the qualitative team that the three main lessons were: they needed: (1) to let their kid to choose his/her own books, (2) to find a reading area and time at home, and (3) to get involve in their child’s reading without putting too much pressure, making it fun. According to the qualitative team all the interviewed parents expressed satisfaction with the workshops’ content and the way in which they were conducted. Also, parents mentioned that they have been implementing the strategies that were taught at the workshops.

"What I have liked of the workshops is that they teach how to involve kids in reading. Also, how to make other family members read." [Parent]

"For me it´s motivating that I receive tips that I can apply at my house. I have new tools, for example what to ask my kid when he is reading." [Parent]

Parents reported that the value the advice given at the workshops on how to help them read better and have a better relationship with their kids. As mentioned before, workshops were also an opportunity to teach how to use the *Mundo de Libros* platform and reinforce its relevance.

“I like that they give suggestion that we can implement at home, I like that, to come and learn tips. Here they give me tools, for example, they just told me: ‘you can ask this and that question.’ (…) I learn, I like to learn and moreover because I have many children, I like to invest my time, I think it is very good to invest time in them when they are little and to promote reading, because my parents didn't do ’t with me.” [Parent]

"What I like is that they have taught me to tried to get them into reading, to read! To get the family involved so everyone reads. That is not only for them to sit and watch TV." [Parent]

"They have helped me understand that we need an adequate space for reading and to spend some time with them [children]. Because I didn't do it, I didn't pay a lot of attention to what she was doing." [Parent]

5. Conclusions

With the ACR grant, QFD developed and implemented the *Mundo de Libros* program as part of the "Matching Children with Level-Appropriate Books and Engaging Families" project. This project aims to improve the reading skills and habits of students enrolled in Grades 1 to 3 in Spanish-speaking countries. It uses an innovative technology-based tool that matches children with level-appropriate books; that is, books that meet their reading skills and their topics of interest. In addition, it seeks to foster parents' engagement in their child's reading activities.

The quantitative and qualitative analysis point to positive effects on reading skills and habits. The quantitative analysis presented in this report shows positive potential effects of the program on different dimensions; unfortunately, we did not have enough statistical power to estimate some of those effects with precision. Exposure to the program had a significant effect on letter-sound knowledge, which in the most basic reading skill and the based for other skills. Also, being an active participant had a significant effect on "familiar word reading" and, in general, displayed positive though non-significant effects. Attendance of parents to workshops had the stronger positive relationship with assessment results. Particularly, attendance displays positive effects on most of the EGRA sections compared to not being assigned to workshops. Finally, technology involvement seems to be the only important driver of website usage to see book recommendations. Loan patterns also suggest that the program made a difference for some participants, in terms of reading habits.

The qualitative analysis also suggests positive outcomes of the program, especially among the most active participants. This analysis helped us understand what is behind the data; what worked and did not work. It also allowed us to detect implementation problems and to explore their probable causes. Having constant feedback from the qualitative team allowed to make early adjustments to the project. There are multiple

factors, internal and external, that influenced the implementation and take-up of the program. Time availability is a key factor for participation: visiting the library, using the platform, attending workshops, etc. Digital skills are fundamental to the use of the technology component. Overall, access to books facilitate reading activities and parental involvement, with parents making the effort of taking children to the library corner and reading with/to their children.

5.1. Lessons

Mundo de Libros turned out to be an ambitious and challenging project, which was subject to many internal and external factors. Over the course of the project, QFD learned many lessons that would inform the next stage of the program. Some of the main lessons of this project are:

- Access to books fosters reading, especially among early grade readers who are just learning to read and love physical books. Participants value the opportunity of having free access to a variety of high-quality books that they could take home. Facilitating access to books can change the reading habits of the participant and other family members. However, factors related to family dynamics (i.e. time, distance, other activities) and the community context (i.e. security, weather) can affect the opportunities to attend the library to access the reading materials.
- Reading corners have positive externalities for other members of the BD. Although loans were restricted to MdL participants, all BD members had free access to the books on-site and many took advantage of this opportunity.
- Children feel empowered and motivated by being able to choose the books the want to read. By having a variety of topics, children can explore different topics and define their interests. Parents can learn to guide the book selection and to respect their child’s choices.
- Providing book recommendations by itself is not enough to change the book selection dynamics and consequently, improving reading skills. It is necessary that librarians, parents and children understand the logic behind reading adequate-level books rather than just choosing attractive books.
- Basic digital skills are fundamental when there is technology component. The lack of these skills, combined with literacy skills, can turn technology into an obstacle rather than a promotor or reading. For young children just learning to read and writing the website address can represent a challenge.

- Some parents and caregivers realized their own limitations in terms of digital skills and sought help. BDs' staff could play a more active inviting children and parents in the MdL program to attend a digital training courses, and promoting the use of the technology-based platform. Parents also need to understand the relevance of the platform component and to feel included into the website (reason to include a new module for parents).
- Parents want to help their kids improve their reading skills but often lack the tools or knowledge to do so. In addition, they face many contextual constraints, mainly lack of time, which difficult this task. Although not many parents participated on the workshops, we received positive feedback about them.
- Across the libraries we saw that parents or caregivers made an effort (in terms of time, money, distance) to bring their children to the library for books and they spend time reading with them or listening to them reading aloud. Coming from a dynamic with low literacy activities this seems like a good first step.
- Librarians play a crucial role on the program's promotion, operation and participation. A committed and motivated librarian can make a big difference in terms of participation of children and parents. It is important to make librarians feel that they are part of the program and to make sure they understand its objectives, components, protocols and goals.
- The book-reader matching algorithm has some flaws and need to be improved. Data collected through assessments and loan activity can help to adjust the algorithm. New methodologies for matching, like machine learning, can be explored.

5.2. Next stage and Scale-up

Thanks to the collaboration with Fundacion Proacceso, after the ACR grant ends, *Mundo de Libros* will continue operating in 10 Bibliotecas Digitales. QFD will continue monitoring and analyzing libraries' activities, while planning the next stage of the project. The core of the project, the technology-based platform with the matching algorithm, has already been developed thanks to the generous support of the ACR partners. We acknowledge that there are some adjustments that need to be made to make the platform more attractive and user-friendly, and to improve the matching algorithm. The experience in this stage has proved that this is a feasible and relatively low-cost intervention to scale-up given that the development costs have been covered. Nevertheless, we would need more evidence and additional evaluation before being able to scale-up or implement in different settings.

Based on the lessons and results from this first stage of the program, we are considering different scenarios for the next stage.

1) *Expanding to other BDs:* One approach would be to replicate MdL in other BDs. This would imply adjusting the program based on the experience and lessons from this stage. Funds will be required to equip libraries but operation.
2) *Implementing MdL in schools:* Test the MdL in elementary schools to reach a wider and more diverse audience, and to take advantage of book stock of school libraries while expanding the MdL book-leveled catalog. This last point is particularly relevant as it would provide evidence on the scalability of the program within the school setting. Workshops would take place at school.
3) *Centralizing and distributing books:* This will involve centralizing the book stock of the 3 least active libraries and design a loan scheme with BD and/or schools. Participants will be required to select their desired books through the website wish list and QFD will distribute the requested books (up to 2) at BDs or schools every 2 weeks. We could use the existing book stock but would need to work on the distribution logistics.

Each of these scenarios has different logistics and funding implications, which we plan to analyze carefully. We will also analyze the possibility of extending the grades/age group covered by the program.

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ANNEX A: EGRA Subtasks

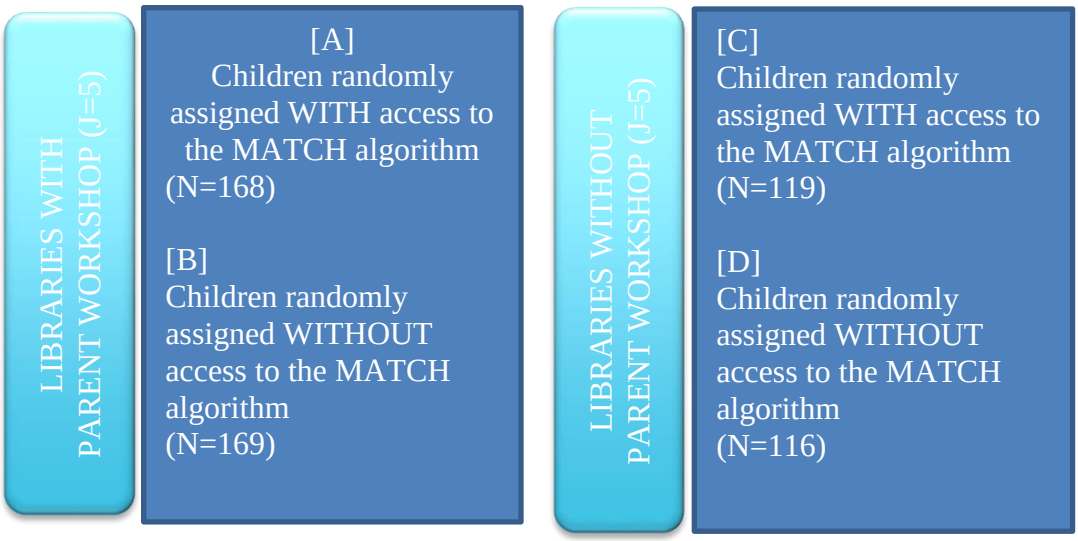
Subtask	***Type***	***Description***
Letter-sound Knowledge	Timed	This subtask is measured as correct letter-sounds read in one minute (CLSPM). Letter-sound Knowledge is a measure of alphabet knowledge. Each student had the opportunity to read up to 100 upper and lower-case letters.
Initial Sound Identification	Untimed	Initial Sound Identification is measured as the number of correct initial sounds identified out of ten questions. Each student had the opportunity to identify ten beginning phoneme that is different from two others in a series of words.
Familiar Word Reading	Timed	This subtask is measured as the number of correct familiar words read in one minute (CFWPM). Each student had the opportunity to read up to 50 words.
Non-word Reading	Timed	Non-word Reading is measured as correct “non-words” read in one minute. Non-word Reading measures decoding (CNWPM). Each student had the opportunity to read up to 50 one and two syllables “non-words”.
Oral Reading Fluency (ORF)	Timed	ORF is measured as correct words read in one minute. ORF is a decoding and reading fluency measure. Each student had the opportunity to read 40 words. The ORF passage formed the textual basis for the Reading Comprehension subtask.
Reading Comprehension	Untimed	This subtask is measured as number of correct answers verbally delivered to the assessor based on questions asked about the passage read as part of the ORF subtask. Each student had the opportunity to answer five factual questions.
Adaptive Oral Reading Fluency (AORF)	Untimed	AORF is measured as the number of correct words read within a passage. Students were presented one of two different stories according to their performance in the Reading Comprehension subtask (three correct answers threshold). Students routed to the short passage (Outcome B) had the opportunity to read 97 words, and students routed to the longer passage (Outcome C) had the opportunity to read 164 words. The passages varied in difficulty in terms of word, sentence and paragraph length.
Adaptive Reading Comprehension	Untimed	This subtask is measured as the number of correct answers verbally delivered to the assessor based on questions asked about the corresponding passage from the AORF subtask. Students had the opportunity to answer four factual questions and two inferential questions. Incorrect answers were also captured in an open-ended format for analysis purposes.

Source: STS-QFD Baseline Report

ANNEX B: Evaluation Design

The effect of the MATCH algorithm will be assessed through a weighted average of the comparisons [A] to [B] and [C] to [D] groups. If complementarities between the parent workshop and the MATCH algorithm exist, it is likely that the effect of comparing [A] to [B] will be higher than that comparing [C] to [D]. The statistical analysis will control for the fact that the three replacement libraries entered later into the program.

Figure 3: Sample Groups



Note: J – library; N= students

The main concern of this design is that some contamination might exist if children within a library imitate other children's decisions and choice of books. This could result in a reduction of the true effect of the MATCH algorithm. The solution to this problem would be to assign treatment of the MATCH algorithm at the library level, but this reduces statistical power. Qualitative analysis will complement the quantitative assessment and will give further information about possible contamination.

Similarly, the workshop component (research question 2) could be evaluated through a weighted average of the comparisons between [A] - [C] and [B] - [D]. Assignment in this case is not individual since the likelihood of contamination is higher. Therefore, given the intra-class correlation, this design does not give sufficient statistical power to assess the effect of the workshops. In addition, assigning treatment at the library level in this small sample increases the risk for unbalance, even if the assignment is random. Qualitative analysis and fidelity of implementation (FOI) will complement the quantitative assessment and will be used as the main strategy to evaluate potential benefits in the case of parents' workshops.