



Leveraging Digital Media to Support Venezuelan Children in Peru: *Jardín Sésamo* and the *Sésamo* Chatbot

Kim Foulds

Sesame Workshop New York, New York, USA (kim.foulds@sesame.org)

ORCID ID: 0000-0003-1782-9926

Mónica Rodríguez C.

Sesame Workshop, Bogotá, Colombia (monica_rodriguez@mail.harvard.edu)

ORCID ID: 0000-0002-0666-0179

Carolina Casas

Sesame Workshop, Bogotá, Colombia (carolina.Casas@sesame.org)

ORCID ID: 0000-0003-0914-525X

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ABSTRACT

For children affected by displacement, the short- and long-term benefits of schooling include providing them with a sense of normalcy and a nurturing environment, assisting them with socialization, helping them cope with trauma, and creating hope for a better future. Nevertheless, schooling disruptions in response to COVID-19 have heightened the breadth and depth of challenges to provide children affected by emergencies, crises, and conflict with critical development opportunities. Focusing on displaced Venezuelans in Peru, COVID-19 has exacerbated the extent of adversity facing Venezuelan migrants, particularly young children. Prior to COVID, most preschool and school-age Venezuelan children living in Peru were not enrolled in educational programming. Due to COVID, additional restrictions to access to structured learning opportunities have left these communities with little to no educational offerings for their young children. Given these realities, this paper will consider the intersection between the importance of early childhood development interventions to mitigate the effects of displacement and the potential for hybrid early learning interventions to reach marginalized populations in low-resource settings in response to both government and bio-safety measures. This case study will highlight the development, refinement, and implementation of a complementary

set of interventions to provide educational support for young children and their parents within Venezuelan migrant families in Peru. It will complement the emerging body of evidence around digital solutions for early learning, expanding it to consider how these interventions can support children and families affected by displacement and on the move.

KEYWORDS

Early childhood development; displacement; EdTech; mobile learning; parent engagement; nurturing care; Peru, Venezuela

Aprovechando Plataformas para Apoyar a la Niñez Venezolana en Perú: *Jardín Sésamo* y el *Sésamo* Chatbot

RESUMEN

Para la niñez afectada por el desplazamiento, los beneficios a corto y largo plazo del aprendizaje formal incluyen brindarles un sentido de normalidad y un entorno protector, apoyar su socialización, ayudarlos a sobrellevar el trauma y fomentar la esperanza de un futuro mejor. Sin embargo, las interrupciones en los servicios educativos en respuesta a la COVID-19 han exacerbado el alcance y la profundidad de los desafíos para llevar a las niñas y los niños afectados por emergencias, crisis y conflictos oportunidades esenciales para su desarrollo. Para la población venezolana desplazada viviendo en Perú, COVID-19 ha exacerbado la profundidad de la adversidad que enfrentan, particularmente para las niñas y niños más en edad temprana. Antes de la pandemia, la mayoría de niñas y niños venezolanos en edad preescolar y escolar que vivían en Perú no se inscribían en programas educativos. Debido a la COVID-19, restricciones adicionales para acceder a oportunidades de aprendizaje estructurado han dejado a estas comunidades con poca o ninguna oferta educativa para los más pequeños. Dadas estas realidades, este artículo considera la intersección entre la importancia de las intervenciones de desarrollo de la primera infancia para mitigar los efectos del desplazamiento y el potencial de las intervenciones de aprendizaje temprano que aprovechan modelos híbridos para llegar a las poblaciones marginadas en entornos de bajos recursos respondiendo tanto a las medidas gubernamentales como a las de bioseguridad. Este estudio de caso destacará el desarrollo, perfeccionamiento e implementación de unas intervenciones complementarias para brindar apoyo educativo a niñas y niños en edad preescolar y sus cuidadores principales en familias migrantes venezolanas en Perú. Este documento complementará el emergente acervo de evidencia en torno a las soluciones digitales para el aprendizaje temprano, ampliándolo para considerar cómo estas intervenciones pueden ayudar a niñas, niños y familias afectadas por el desplazamiento y en situación de movilidad.

PALABRAS CLAVE

Desarrollo infantil temprano; desplazamiento, EdTech, aprendizaje móvil, participación de los padres, cuidado cariñoso y sensible, Perú, Venezuela

LEVERAGING DIGITAL MEDIA TO SUPPORT VENEZUELAN CHILDREN IN PERU: JARDÍN SÉSAMO AND THE SÉSAMO CHATBOT

The literature on the value of education interventions in emergency and conflict-affected settings directly links early childhood interventions with mitigating the effects of adverse childhood experiences. The short- and long-term benefits of schooling include providing children with a sense of normalcy and a nurturing environment, assisting them with socialization, helping them cope with trauma, and creating hope for a better future (Britto et al., 2016; Bouchane et al., 2018; El-Haj et al., 2018; Murphy et al., 2018; Shonkoff et al., 2012; Young, 2007; Gertler et al., 2013). Nevertheless, schooling disruptions in response to COVID-19 have heightened the breadth and depth of challenges to provide children affected by emergencies, crises, and conflict with critical development opportunities. Given the prolonged duration, concerns of infection, boredom, lack of routine, lack of in-person social engagement with peers, and family financial loss, researchers and policy advocates are particularly concerned about the long-term psychological impact of COVID-19, in line with earlier work on young children's psychosocial responses to previous pandemic disasters (Sprang & Silman, 2013).

Venezuela's political, humanitarian, and economic crisis has driven approximately 6 million people to flee the country—the largest external displacement of people in the Western Hemisphere's history—with 5 million relocating to neighboring Latin American countries. With nearly 1.3 million Venezuelans, Peru is currently the second largest recipient of displaced Venezuelans and hosts more Venezuelan refugees than any other country worldwide (United States Agency for International Development, 2022). Venezuelans in Peru face multiple economic and social barriers. While initially providing a supportive environment for Venezuelans relocating to the country (Ble et al., 2020), the Peruvian government experienced increasing pressures to curtail immigration and responded by instating a humanitarian visa. This requirement, and its arduous application process, have significantly restricted Venezuelans' ability to enter and access financial and social services and led to increased rates of irregular entering and undocumented stays. The situation caused a deeper state of vulnerability and marginalization, as Venezuelan migrants are excluded from accessing the formal economic sector and critical social services, like healthcare and education, while also living in state fear of government authorities (Ble et al., 2020).

Access to schooling and other structured early learning opportunities for displaced Venezuelan children was challenging even before the COVID-19 pandemic. Data from 2018 show that nearly 75% of Venezuelan children 3 to 5 years old living in Peru did not attend early childhood development (ECD) services, and an estimated 60% of school-age Venezuelan children in Peru were not enrolled in school (UNICEF Peru, 2020; Instituto Nacional de Estadística e Informática, 2018). Despite significant government efforts to expand enrollment, such as the municipal government *Lima Aprende*, other barriers, including insufficient knowledge of the education system, limited financial resources, lack of support networks for primary caregivers, and absence of psychosocial support, continued to impede sufficient access for this population.

COVID-19 exacerbated the depth of adversity facing young children. Although the long-term impact on young children's holistic development remains unknown, emerging evidence indicates that both the short-term and long-term effects are deeply concerning, especially in the context of low access to necessary services (The World Bank et al., 2021, Dupraz-Dobias, 2022; Moya et al., 2021). COVID-19 restricted access to structured learning opportunities, with many children not being able to start school or losing contact with their educational communities due to prolonged center closures throughout the country (Saffirio, 2021; Alcazar & Balarin, 2021).

In April 2020, as part of its COVID response efforts, the government of Peru launched *Aprendo en Casa*, or “I learn at home,” to support remote learning for early childhood, elementary, and secondary school students.¹ While responsive to the needs and opportunities of many Peruvian children, the program was inaccessible to large swaths of society given the initiative's reliance on access to TV or the Internet, not available to many refugee and migrant families, as well as those living in indigenous and rural communities, and children with disabilities (Equilibrium CenDE, 2021). A recent synthesis of global evidence further reinforces the inequities in access to digital learning resources as part of a government's COVID-19 responses. These discrepancies have been found based on variations in household income levels in Kenya, along the urban/rural divide in Mongolia and Ethiopia, and according to parents' education levels in Bangladesh and Ecuador (McBurnie et al., 2020). Where online resources are available, there are still pronounced variations in use. Less than 1% of Senegalese students, 1.5% of Bangladeshi students with Internet, and 15% of Ghanaian students have accessed available online resources and courses. Lack of electricity, Internet, and devices have been reported as barriers limiting their access to digital resources. Even where household Internet and device availability is higher, like in Ecuador, only 8% of students in grades 10, 11, and 12 used the government's learning platform (McBurnie et al., 2020).

Given these marked variations in access and use, educational experiences provided through mobile phones play a critical role in supporting children and their families (Yoshikawa et al., 2020), particularly those populations unable to enroll or participate in government programs. Global data show that while Internet access varies considerably between upper-middle, middle, and low-income countries, more than 70% of households own at least one mobile phone, which means that low-tech solutions that leverage these devices have the highest potential to reach low-resource and marginalized households (Carvalho & Crawford, 2020).

This paper will consider the intersection between the importance of early childhood development interventions to mitigate the effects of migration and the potential of early learning interventions, by examining a hybrid implementation model to overcome access barriers to early learning content faced by marginalized populations in low-resource settings. Employing monitoring data and user feedback, this case study will highlight the development, refinement, and implementation of a complementary set of interventions to provide educational support for young children and their parents within Venezuelan migrant families in Peru. While specific to Venezuelan migrants in Peru, there are important lessons learned that might be relevant to

¹ Through its Caring For Each Other (Cuidándonos unos a otros) initiative, Sesame Workshop provided no-cost broadcast licenses to the Peruvian Ministry of Education for over 100 hours of television content to be used in *Aprendo en casa*. The content spanned Sesame's whole child curriculum, with a special focus on health, emotional well-being, and school readiness. *Aprendo en casa* is available here: <https://aprendoencasa.pe/#/>.

decision-makers and practitioners in other similar settings. The case study will showcase the importance of community engagement in conceptualizing and refining interventions, as well as share lessons learned throughout the implementation process.

This paper is organized into the following sections: an overview of the intersection of digital interventions, displacement and migration, and nurturing care; a review of the design, pilot, and implementation of *Jardín Sésamo* and the *Sésamo* chatbot; results from the full-scale implementation of these digital solutions; and discussion of the findings.

Digital interventions, displacement and migration, and nurturing care

As widely acknowledged, the first eight years of life are the most important for human development since early experiences affect the quality of brain architecture by laying the foundation for lifelong learning, health, and productivity (Center on the Developing Child at Harvard University, 2007). Existing evidence demonstrates that it is responsive and rich social interactions with caregivers that best supports healthy brain connections and those foundations (Zosh et al., 2017). In line with this evidence, for children to reach their full potential, the nurturing care framework identifies five distinct but interrelated components of a nurturing care environment: opportunities for early learning, responsive caregiver, safety and security, good health, and adequate nutrition (World Health Organization et al., 2018). By leveraging parents and caregivers as children's first teachers, the framework provides parameters for developing and sustaining a stable environment that is responsive to children's developmental needs and presents opportunities for early learning, grounded in interactions with adults that are emotionally supportive and developmentally stimulating (Britto et al., 2016). A common component of interventions that leverages the nurturing care framework to support responsive caregiving and provide opportunities for early learning consists of supporting the frequency and quality of caregiver-child interactions through play and communication (World Health Organization et al., 2018). Parenting programs that integrate nurturing care have proven to significantly improve children's developmental and long-term adult outcomes across diverse geographies (Britto et al., 2016; Gertler et al., 2013; Yousafzai et al., 2014).

A nurturing care environment becomes even more critical for children exposed to adversity during their early years. During the early stages of development, severe and prolonged stress can affect brain architecture and influence physiological responses to anxiety and disease (Bouchane et al., 2018; Shonkoff et al., 2012). Prolonged adversity, chronic neglect, caregiver mental illness, exposure to violence, natural disasters, accumulated burdens of poverty, and everyday forms of violence—without adequate adult caregiver support to mitigate it—can have lifelong implications for physical and psychosocial health (Bouchane et al., 2018; Panter-Brick et al., 2009). Further, experiencing five or more traumatic events triples the risk of psychiatric disorders and post-traumatic stress (Panter-Brick et al., 2009; Shonkoff et al., 2012). Nurturing care interventions designed to support children's resiliency have the potential to mitigate the negative effects of Adverse Childhood Experiences (ACEs) on children's long-term cognitive and socio-emotional development. In addition, interventions that support responsive relationships between caregiver

and child can also buffer a child from the effects of stress while helping both children and adults strengthen their resiliency skills to prevent the long-term negative impact of ACEs (McCoy et al., 2022; Sanders et al., 2020).

Concerns about access to critical early learning opportunities exacerbate these challenges and long-term effects of ACEs for children affected by displacement and migration. Often, migrant and refugee communities face legal challenges, as many governments limit access to education to citizens or require direct or indirect fees that are out of reach for these families. Other barriers to young children's educational opportunities include limited space and overcrowded classrooms, language barriers, discrimination, and distance to school (Lewis & Thacker, 2016; Drolia et al., 2020).

Migrants are especially vulnerable. In recognizing a person as a refugee, someone who has fled their country of nationality due to fear of death or persecution, international and regional legal regulations guarantee their safety and freedom. In designating a person as a migrant, someone who has chosen to leave their country of nationality for a variety of reasons, the national immigration laws of the host country are applicable, limiting thus the ability of local and international organizations to provide humanitarian support (Lobos, 2022). These barriers to access are aggravated by deportation policies that can lead to parental detention and deportation, economic strain, housing instability, and food insecurity (Bartlett, 2015). The impact of these issues is reflected in student learning, as migrant status is consistently associated with low learning results on large-scale international studies in both OECD and non-OECD countries (UNESCO Office Santiago and Regional Bureau for Education in Latin America and the Caribbean, 2016). The effects of government lockdowns to reduce the transmission of COVID-19, including school closures, have significantly increased existing inequalities to access, particularly for migrant children (Darmody et al., 2021).

Given the troubling intersection of inequitable access to early learning and the long-term effects of severe and prolonged adversity, the need for ECD programming to address these gaps and mitigate the impact of ACEs is particularly acute. Nevertheless, one additional challenge to reaching migrant families is that they are often on the move. As a result, there has been an important focus on designing and implementing ECD programming delivered through digital platforms to reach families wherever they are. While not intended to resolve to all issues of access, where technology infrastructure supports connectivity, digital programming has the potential to deliver educational interventions at scale at a relatively low cost, including the implementation of a curriculum and records system that can follow children and families on the move or those unable to attend an early learning program. Digital educational programming also offers the possibility to certify student educational achievements and support academic promotion. Digital delivery can also facilitate the active participation of parents in their children's learning while providing implementors with real-time data to make critical programmatic adaptations (Lewis & Thacker, 2016). Digital interventions, however, often come short of their potential. Recently recorded concerns include students finding it challenging to use the proposed digital application, multitask, or be unable to interact with their classmates and engage with learning amidst inconsistent electricity or network access. More structural concerns raise the issue of "digital humanitarianism," which relies on technology-based interventions designed by Global North actors that are decontextualized from the learning context of those in the Global South (Menashy & Zakharia, 2020).

Despite this increased focus on digital educational interventions, there is limited rigorous evidence available broadly and even less so in humanitarian or emergency settings or specific to early childhood. Existing evidence does suggest, however, a significant potential for digital educational interventions. For adolescent Syrian girls living in the Zaatari refugee camp in Jordan, Open Learning Exchange and UNHCR designed a digital system to help create community learning centers to support the girls' personal learning and decrease school dropout. Monitoring and research data revealed that the digital program addressed girls' safety concerns and helped them develop a strong desire to learn, a sense of optimism about their futures, and stay in school. These learnings also supported the scale-up of the program in Nepal, Ghana, Kenya, and Uganda (Wagner, 2017). For primary school students living in the Dadaab and Kakuma refugee camps in Kenya, an SMS-based study tool to incentivize them to attend school and allow them to continue studying during school closures helped improve their grades by 21% across two school terms (Wagner, 2017).

Additional evidence has emerged as governments and organizations have developed remote education interventions for early education and primary school students as part of their COVID responses. These interventions have largely followed lessons learned from previous digital education interventions but also increased, in line with the nurturing care framework, the focus on parent engagement in the learning process, given the age of the students. The first study to experiment with strategies to mitigate the impact of COVID on disruptions to education for young children analyzes the effects of two interventions in Botswana, where schools were closed from March to June 2020. On re-opening, a new wave of COVID cases in the country prompted another school closure, with similar waves to follow in the ensuing months. In July 2020, schools operated a double-shift system, with students attending either a morning or afternoon session, reducing their learning time by half. Concerns over school closures were particularly salient given that 2017 data indicated that 32% of Botswana students in grade five could not do subtraction, and 44% could not read a simple story (Winthrop et al., 2020). While the Ministry of Basic Education experimented with remote learning programs through radio and television, nearly all parents of young learners reported wanting more remote educational activities for their children. In response, students were assigned to one of two treatment groups or a control group. Families in one treatment arm received an SMS message that included simple numeracy problems; families in the second treatment arm received weekly phone calls from instructors in addition to those same SMS messages. Results showed that both interventions led to cost-effective numeracy learning gains, with the most significant effect (0.29) seen in the intervention that included SMS messages and a weekly phone call, an effect size comparable to other, more intensive early learning interventions. Notably, parents also showed an improved ability to accurately assess their child's learning because of the SMS intervention, and even more so with the combined SMS and phone call intervention (Angrist et al., 2020).

In Costa Rica, given that most communication between education providers and parents occurred through phone calls and WhatsApp groups during the COVID-19 pandemic, the Ministry of Public Education (MEP) experimented with parent-facing text messages to support children's learning at home (Hernández-Agramonte et al., 2022). MEP realized that while older students require less at-home adult engagement during remote learning, preschool

students need parent or caregiver engagement at home for learning to happen. However, this situation presented multiple challenges as they found that more than half of the parents reported needing more help; similarly, many wanted more activities to implement, combined with more direction regarding the application of those activities. To explore how to better support parents, the Inter-American Bank funded an experiment that provided parents of preschool students with text messages to support their children's learning at home. After 15 weeks of intervention, the cognitive skills of children whose parents received text messages rose 0.11–0.12 standard deviations (SD), with the effect largely driven by improved early numeracy skills. Parents who received text messages also increased the number of activities performed with children by 0.23 SD. Further, the text messages proved to be a springboard for additional learning, as parents reported being more likely to complement the distance education program with extra activities (Hernández-Agramonte, et al. 2022).

Building on available evidence, researchers and practitioners have developed a series of guiding principles for designing digital education interventions, such as i) a clearly defined purpose and context for each digital intervention; ii) intervention responds to a problem based on existing technology use and habits as one of the tools in that response; iii) content is an open source; iv) training and professional development are provided to teachers and facilitators; v) research and learning are part of the process to support the evidence base; and vi) strengthened partnerships with implementors and technology companies (Lewis & Thacker, 2016; Wagner, 2017). Findings regarding *Jardín Sésamo* and the *Sésamo* chatbot will be discussed through these same guiding principles.

Increasing access to ECD resources for Venezuelan migrants in Peru: Overview of *Jardín Sésamo* and the *Sésamo* chatbot

Guided by intersections between digital education interventions, educational inequities, adversity due to displacement and migration, and the nurturing care framework, Sesame Workshop—the nonprofit organization behind *Sesame Street* and *Sésamo*—sought to validate two innovative digital solutions focused on increased access to and interaction with quality learning content to support displaced and migrant Venezuelan children living in Peru and the host communities where they lived. The intervention included two content distribution mechanisms, namely *Jardín Sésamo* and the *Sésamo* chatbot. Funded by the BetterTogether / JuntosEsMejor Challenge of the U.S. Agency for International Development (USAID) and Inter-American Development Bank (IDB), and in partnership with World Vision (WV), a leading humanitarian organization in Peru, Sesame Workshop piloted these interventions with 5,888 young children and caregivers that WV served directly or through local partnerships in Lima, Tumbes, and La Libertad.²

Jardín Sésamo was based on a Next Unit of Computing (NUC)—an electronic device in the form of a 10 x 10 cm box functioning as a minicomputer—housing a selection of Sesame's engaging, age-appropriate, and education-driven content curated with the needs of vulnerable

2 Sesame prioritized these sites because they have the highest concentration of Venezuelan migrants in Peru. WV was chosen as a partner, in part, because of their work in these locations.

migrant families with young children in mind. The NUC has been designed to generate its own wi-fi signal that enables users within its range to access a URL (<http://jardin.sesamo.com>) through smartphones without consuming their own browsing data. The device can also connect to an intelligent television or computer for collective viewing and use of available resources. Users accessing content through their phones might download text and image-based resources for future use as desired.

The Sesame content stored in the *Jardín Sésamo* device included interactive storybooks, games, videos, and printables with family activities and advice for caregivers, among others, organized under four thematic areas aligned with the prioritized needs of its intended users: emotional regulation and management (Emotions/*Emociones*); opportunities for learning through play and everyday activities (Learn wherever you are/*Aprendizaje donde estés*); hygiene, health, and self-care practices (Health/*Salud*); and fostering a sense of community (Community/*Comunidad*). The portable nature of the NUCs—including their size, weight, protective casing, and component stability—enabled implementing partners to transport the devices to a wide range of locations with a high influx of Venezuelan migrants.

Jardín Sésamo was complemented by the *Sésamo* chatbot, an interactive chat response system using WhatsApp that allowed families to navigate trusted, impactful content tailored to meet their specific needs through their smartphones. The *Sésamo* chatbot was implemented with caregivers arriving at community kitchens supported by WV, and its use was promoted during *Jornadas Sésamo* (*Sésamo* days) held in this period. Caregivers received printed promotional material during the information session to support engagement. In addition, WV disseminated two explainer videos and digital versions of chatbot posters through its WhatsApp groups with past and current beneficiaries of migrant-facing interventions.

To complement the digital content, WV developed an additional approach called *Jornadas Sésamo* in partnership with Venezuelan migrant associations and local churches. It included setting up itinerant access points to *Jardín Sésamo* devices and conducting informational sessions on both digital alternatives to access quality learning materials for families. Implementation of *Jornadas Sésamo* occurred in thirty to forty-five-minute shifts during which a group of up to twenty adult-child dyads or triads accessed the school patio, community hall, migrant center, or another public venue to interact with Sesame's digital solutions. Caregivers arriving at community dining halls during meal take-out were convened in small groups before or after food delivery to learn about the project and its digital solutions. At churches, sporting facilities, health centers, public schools, and parks, project facilitators also presented these opportunities and explained how they worked.

During these sessions, adults had a chance to test both solutions onsite, using their own cell phones to explore, interact, and download assets of interest to them or their children. While the adults learned together about the *Sésamo* alternatives from the WV staff, children were engaged elsewhere with printed resources with facilitator support. They then joined their caregivers in playing games, watching videos, or reading stories that invited them to reflect and reinforce their knowledge of emotions, health and self-care, and community building, among others. In these sessions, caregivers also received printed promotional material on the *Sésamo* chatbot, interacted onsite with the content—alone or with their children when present—and

downloaded activities on their mobile devices before returning home. Printed assets displayed at each dining hall, like Sesame storybooks and posters, served to illustrate the type of content available and motivate interactions offsite.

Methods

Focusing on the development and implementation of a pilot intervention that deployed two content distribution solutions, the findings of this paper draw from a series of research activities designed to inform design, application, and refinement. Research activities were conducted in two phases, first during the pilot implementation phase, and then during scale-up. Table 1 details these two phases, covering research design and research questions, participants, instruments, procedures, and data analysis for each.

Table 1. Research Methods

	Phase 1: Pilot	Phase 2: Scale-up
Research questions	• What are current levels of technology access, particularly mobile smartphones, for target communities? • How willing are parents of young children from target communities to use digital solutions for learning? • How is the intended intervention perceived by caregivers and providers? • What are the barriers to engagement with the proposed solutions for caregivers and providers?	• What are caregivers' patterns of content use? • What are caregivers' perceptions of the content offered? • What are continued barriers to engagement for caregivers?
Research activities	• Diagnostic survey to assess target communities' access to technology and willingness to engage with digital solutions to support learning • Quantitative in-person monitoring records • Back-end device log data	• Beneficiary and provider surveys • In-depth interviews with caregivers and providers to assess perceptions of the program • Usage log data from 11 devices: 6 devices in Lima, 2 in La Libertad, and 3 in Tumbes
Participants	• 218 survey respondents recruited from past and current beneficiaries of WV's Hot Meals program with children 2-7 years old • 147 in Lima, 53 in La Libertad, and 18 in Tumbes	• 1,324 beneficiary and 47 WV provider survey respondents in Lima, Trujillo, and La Libertad • 96 caregivers and 19 providers interviewed for independent perception study • Usage data collected via the Jardín Sésamo device logs from 3,327 direct adult beneficiaries. IP addresses were used as proxies

	Phase 1: Pilot	Phase 2: Scale-up
Instruments	Diagnostic surveys, designed by WV's MEL Lead and reviewed by Sesame Workshop and monitoring vendor, TecSalud feedback. The survey focused on family demographics, access to technology (including frequency, users, and devices), and perceptions of the role of technology in supporting children's learning and development.	- Beneficiary surveys covering onsite access to Jardín Sésamo materials, frequency of content use, awareness and use of the Sésamo chatbot, and perceptions of the content available in both solutions (including if respondents had shared it with family and friends) - Interview protocols designed by research vendor with input from Sesame Workshop and WV - Quantitative user data pulled from Jardín Sésamo device logs focused on back-end reach data, including rates of interactions³ and content accessed
Procedure	- Data collection for research activities ran between February-May 2021 in Lima, La Libertad, Trujillo, and Tumbes. - Sesame Workshop and WV co-designed the diagnostic survey and qualitative discussion guides. WV first administered the diagnostic surveys. - All adult participants were informed of the study objectives, including potential benefits and risks, and provided verbal consent. Personal identifying information from survey participants was not included in data analysis.	- Data collection for research activities ran between July-October 2021 in Lima, Trujillo, and La Libertad. Sesame and WV co-designed the beneficiary and provider surveys, as well as the qualitative perceptions survey. - Sesame designed the monitoring framework for the device logs. - Sesame collected back-end monitoring data from device logs from the start of implementation. Sesame and WV then implemented the surveys near the end of the program period. - All adult participants were informed of the study objectives, including potential benefits and risks, and provided verbal consent. No personal identifying information was collected.
Data analysis	Data analysis for all qualitative surveys relied on frequency of responses. For qualitative data analysis, the research team applied a coding scheme related to the analytical categories of access, perceptions, barriers to engagement, and implementation.	

Results

Results from the research activities conducted during the implementation pilot and application of the scaled-up hybrid intervention fall along the following domains: access and use of digital technology and Sésamo content, perceptions, and implementation.

³ For *Jardín Sésamo*, an interaction is a NUC log entry indicating the launch/download of a game, story, video, or image-based asset. With the chatbot, an interaction is every user request for an asset registered on the Turn.io platform.

Access and use of content

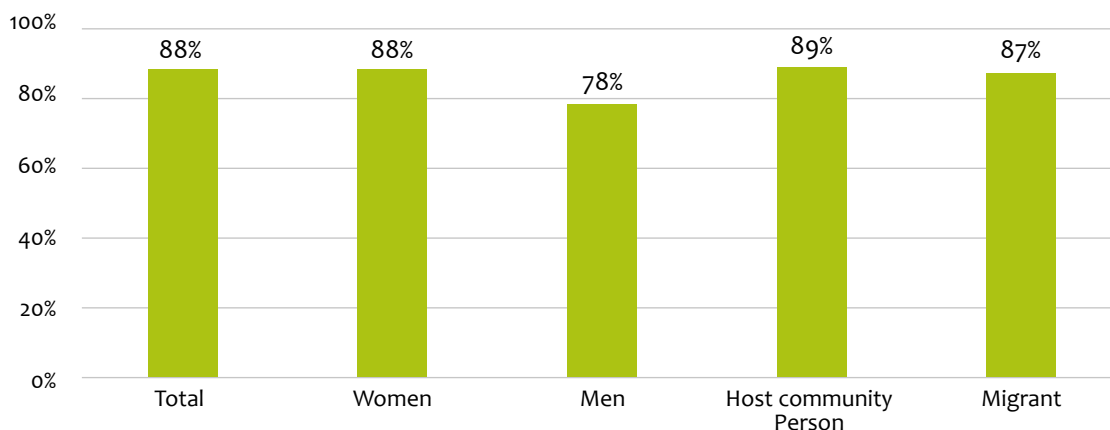
Findings from the diagnostic survey conducted during the implementation pilot highlighted the potential of digital programming to support children's access to early learning during the COVID lockdown. More than 50% of household heads reported that their children did not currently attend or connect to remote classes regularly; 99% of respondents owned a cell phone, and 53.2% of them stated that their children use mobile phones or other devices daily to access entertainment content. 82% of diagnostic survey respondents agreed that children learn new and useful things thanks to technology use, and roughly 92% valued the acquisition of technological skills by their children. 89% of caregivers agreed that cell phones and/or tablets offer learning opportunities that favor the intellectual growth of children.

Access data supported these findings from the diagnostic survey. During the scaled-up intervention, among the 5,888 direct beneficiaries, including 2,195 children and 1,757 parents, interactions with *Jardín Sésamo* content in this period totaled 48,939. As most beneficiaries (76%) were based in Lima, 93% of all interactions were reported in Lima, 4% from Tumbes, and 3% from La Libertad. Printables accounted for 76% of these interactions, games for 14%, videos for 10%, and books for 0.4%.

For the *Sésamo* chatbot, data monitoring reported 30,013 total chatbot interactions among the target audiences in Peru, with 58% of those interactions taking place remotely from WV sites. While data was disaggregated by gender, age, and migration status (host community/migrant), 14,509 interactions had unknown data attached, rendering these data entries incomplete.

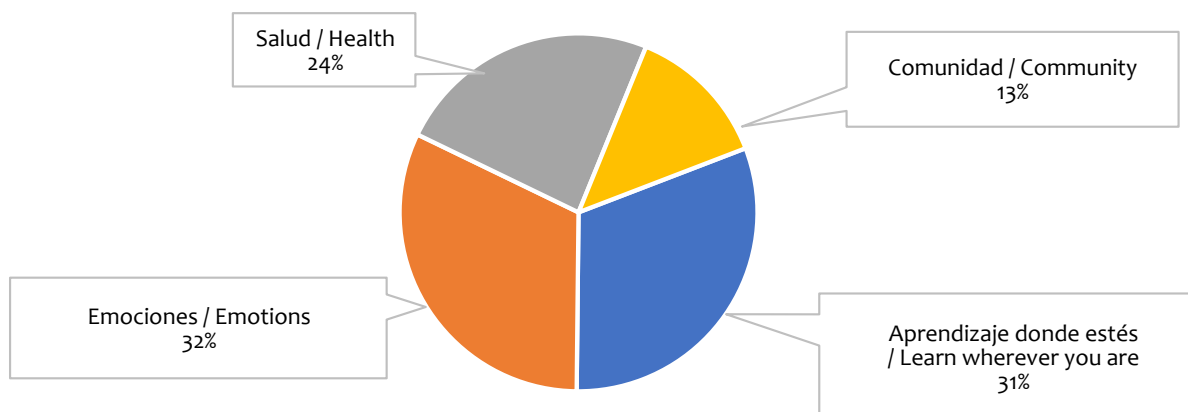
Regarding access to and use of the content available on *Jardín Sésamo* during the scaled-up hybrid intervention, 88% of caregivers indicated increased access to educational content through these digital solutions, including 87% of migrant caregivers (Figure 1). Notably, *Jardín Sésamo* also supported Peruvians in the host community, with 99% reporting increased access to educational content.

Figure 1. Percentage of caregiver survey respondents indicating increased access to educational content



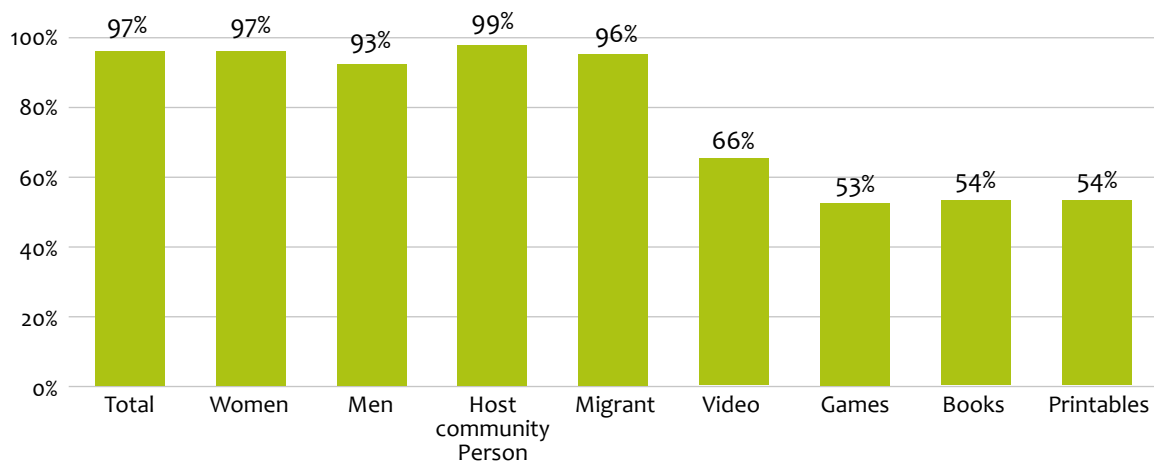
Source: Own elaboration.

Among the four content areas, caregivers downloaded content focused on “Emotions” the most, at 32%, closely followed by “Learn wherever you are” content related to school readiness (Figure 2).

Figure 2. Percentage of content downloaded by content area

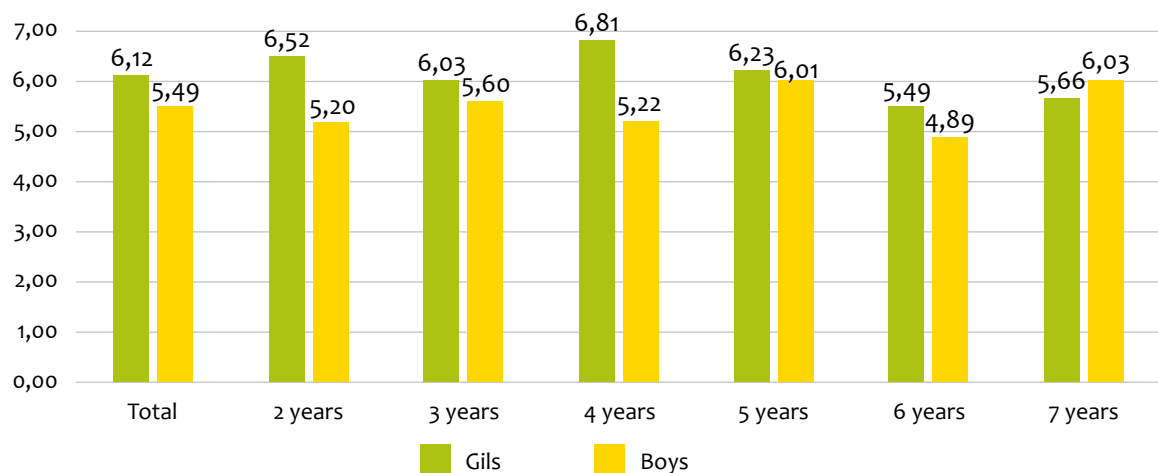
Source: Own elaboration.

Nearly all caregivers participating in the scaled-up hybrid reported weekly use of *Sésamo* content at home, including 99% of Peruvians and 96% of migrants (Figure 3). As for preferred asset types, 66% of caregivers reported viewing *Sésamo* videos, followed by 54% who used *Sésamo* books and printables weekly; 53% reported playing *Sésamo* games weekly.

Figure 3. Percentage of caregiver survey respondents reporting weekly use of *Sésamo* content at home

Source: Own elaboration.

On average, children 2-7 years old spent 5.81 hours per week using *Sésamo* content, with girls using the content slightly more than boys, though there is more than 90 minutes of use variation between 2-year and 4-year-old girls and boys. As seen in Figure 4, time spent by the child's age is reasonably consistent. By age and gender, 4-year-old girls and 7-year-old boys spent the most time using the content.

Figure 4. Average number of hours per week spent using *Sésamo* content, by age and gender

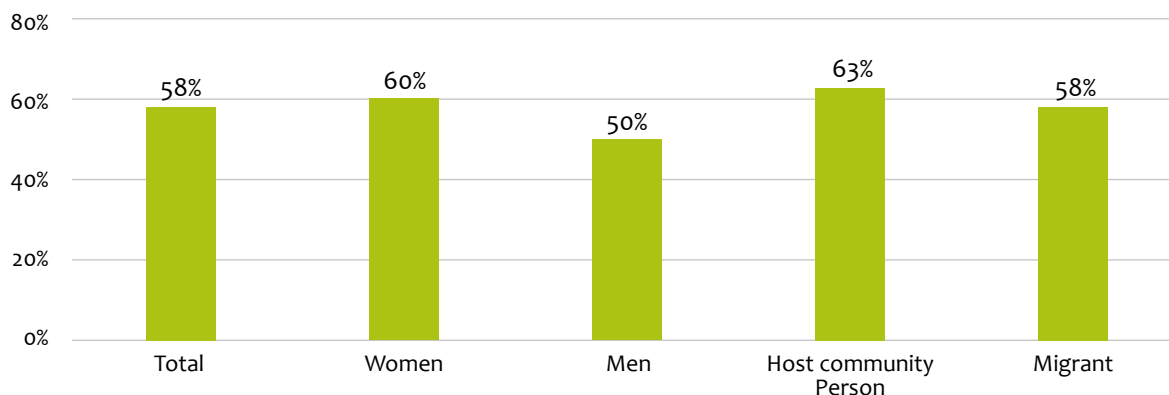
Source: Own elaboration.

There were 229 caregivers, however, who indicated that they had not used the content or the WhatsApp chatbot. The most common responses were lack of time (35%), they forgot to use it (17%), and they did not know how to use it (11%).

Perceptions of content

Caregivers were asked to score their level of satisfaction with *Sésamo* content, providing a score from 1 (not satisfied) to 5 (very satisfied). On average, in all material types, caregivers gave *Sésamo* content a 4.81 satisfaction score.

Based on their perceptions of content and digital solution, 100% would recommend both *Jardín Sésamo* and the *Sésamo* chatbot to other parents. In addition, by the time of data collection, 51% of users had already shared downloaded *Jardín Sésamo* content, and 47% had sent the content they found on the chatbot with friends and family.

Figure 5. Percentage of caregiver survey respondents perceiving value in sharing *Sésamo* content and digital solutions

Source: Own elaboration.

More than half of the respondents (58%) saw value in sharing *Sésamo* content and related digital solutions with other caregivers, including 63% of Peruvians and 58% of migrants (Figure 5). Among providers, 100% of provider respondents reported value in using Sesame content and digital solutions.

Implementation

Findings related to implementation spanned data use, chatbot technology, use of technology at home with young children, and the importance of trusted networks as part of recruitment. Minimizing data required for repeated use of available content was a significant area of interest for implementation. When curating the materials for the project, the guiding technical criterion was choosing downloadable content for *Jardín Sésamo* and the *Sésamo* chatbot that would not drain data plans nor occupy considerable memory space in low-end mobile phones. Based on user feedback, however, videos were added to the chatbot menu. Despite their bigger size, caregivers and children were more accustomed to interacting with these on and offline through television when available at home.

Regarding the chatbot, the implementation revealed existing navigation barriers, such as the inclusion of emojis with keywords that led people to believe both were valid entries to access content or an ‘Error message’ that did not encourage further interaction with the chatbot. Facilitators were instructed to accompany caregivers in registering the *Sésamo* number in their phone contacts and explicitly highlight that there were more resources for downloading after an initial interaction with the chatbot by entering the corresponding menu word. Relatedly, there was some confusion among users on what a chatbot is, with some thinking that there was a person behind the automated messages.

The importance of trusted networks and community buy-in was a critical finding. Qualitative findings from local partners revealed the essential link between effective implementation and developing and nurturing relationships with migrant associations and their trusted leaders. WV partnered with Venezuelan associations such as Veneactiva, GRANMAV, and Unión Venezolana en Perú, among others, to promote the uptake of the proposed digital solutions.⁴ These partnerships resulted in more access points to Sesame content for target audiences. Trusted leaders also included religious leaders, which resulted in the implementation of *Jornadas Sésamo* in different churches in La Libertad, Trujillo, and Lima to enhance their current offerings for caregivers with young children.

Findings also showed that trusted messengers within community networks were more effective promotional vehicles than radio spots and printed media. For example, WV partnerships with faith-based and diaspora organizations and their campaigns through SMS

4 Veneactiva, a nonprofit established in 2019, supports the productive integration of migrants in Peru through, among others, microloans, health insurance, and schooling programs. It also supports the operation of sites known as Venecentros, where migrants can find legal counselling and other services. GRANMAV is a faith-based network led by migrant women to mobilize help for vulnerable families.

and WhatsApp messages to current and previous program beneficiaries led to more referrals to attend a *Jornada Sésamo* than any other recruitment strategy. While, on average, five caregivers arrived at community dining halls convened by WV in July-early August 2021, the number rose to 33 participants on average at subsequent information sessions organized with local partners between the second half of August and October 2021, when pandemic restrictions eased.

Discussion

The findings underscore the potential for digital and hybrid educational interventions, particularly interventions that are contextualized, leverage existing media habits and access, prioritize partnerships with implementors and community leaders, and adapt programming to participants' needs and experiences. High content use rates from caregivers and children, regardless of age and gender, suggest that remote interventions to support children's learning can play a relevant role for families on the move who may have limited access to existing educational services. This means that digital and hybrid education interventions have the potential to both mitigate the effects of displacement and migration in learning disruptions and begin to address educational inequities for migrant communities.

The findings also mirror and reinforce the value of the guiding principles for designing digital education interventions identified by researchers and practitioners (Lewis & Thacker, 2016; Wagner, 2017)⁵:

- Clearly defined purpose and context for each digital intervention
- Intervention responds to a problem based on existing technology use and habits as one of the tools in that response
- Content is an open source
- Strengthened partnerships with implementors and technology companies
- Research and learning are part of the process to support the evidence base

The research design, questions, participants, and measures in Phase 1 supported a refined purpose of the intervention, strengthened an understanding of the context, and confirmed assumptions about existing technology use and habits. The introduction of *Jornada Sésamo* strengthened remote interventions with an in-person component to best support end-users. These higher-touch engagements provided families with a deeper opportunity to connect to the tools while also offering a communal space for families to connect directly with each other as they shared challenges and hopes to better support their children's development. These in-person opportunities also enabled facilitators to model content use, sharing insights on how to

5 While "training and professional development are provided to teachers and facilitators" is one of the guiding principles and was a foundational aspect of implementation for the program, it was not covered in Phase 1 or Phase 2 research, so it is not covered here.

incorporate assets into family learning. These lessons indicate that access and interest in the content is not enough to ensure effective implementation, thus reinforcing the guiding principle that digital interventions are a tool in a response and should not be the entirety of the solutions to challenges in access to early learning opportunities.

All content, across varied mediums and for all thematic areas, was open source for all participants. Open-source content was essential for reaching families and providing learning opportunities to fill gaps in access to early learning opportunities and support the mitigation of ACEs among displaced and migrant Venezuelan families in Peru. It also allowed families to tailor their experience to their children's needs. With content on "Emotions" being the most accessed, followed by "Learn wherever you are," this provides useful initial insights on children's and caregivers' current learning needs and can serve as helpful foundations for additional resource development to meet these prioritized needs. Moreover, ensuring that all content was available via open source for participants allowed for back-end data to understand better preferences across content area and content type and important insights for continued program refinement and future content development. Understanding the types of content families are most likely to use and the frequency with which they view that content also speaks to context and consistent efforts to understand target communities and meet their children's educational needs.

Building on a sturdy partnership between Sesame Workshop and World Vision, the importance of relevant collaborations with implementors evolved as a critical component of context as well, as evidenced by increased reach through the inclusion of trusted messengers and community groups. The anecdotal findings on the importance of trusted community messengers, particularly among a marginalized community navigating a fragile and unsafe context, add an important consideration for future digital and hybrid interventions to consider, as well as a potential addition to the guiding principles previously discussed. While mass media is a useful way to recruit and promote the availability of these services, seeking out communication channels driven by trusted messengers is critical to recruitment and intervention uptake.

The importance of partnerships grounded in trust, both a guiding principle for digital education interventions and a foundational approach to the work discussed here, also addresses the mentioned challenges around "digital humanitarianism" (Menashy & Zakharia, 2020). The findings here offer a program design model that presents a defined framework to ensure that technology-based interventions are not decontextualized from the learning context. This consists of grounding an iterative implementation plan with a research agenda that prioritizes an improved understanding of communities and their unique needs.

The final principle to ensure that research and learning are part of the process to support the evidence base is reflected in the iterative evidenced-based approach to program design and implementation. As Phase 1 research findings informed program pivots for Phase 2, additional learnings from Phase 2 have also identified areas for further exploration. For example, future implementation will consider short webinars to provide this type of engagement to more families. Relatedly, feedback from users also suggests that additional technical and pedagogical support will be significant for the scale-up of these interventions, as well as considerations on whether to include independent navigation options for children, recognizing that they may be expected to access and use the content on their own.

Critically, the research learnings have served as a springboard for new ways to address ongoing implementation challenges. For example, conversations on these challenges within and across teams have resulted in plans for future research on migrant media consumption for a better understanding of effective communication channels and the role of trusted messengers within the diaspora. Conversations with associations and firms of Venezuelan origin in Peru have also revealed a growing need for innovative digital and hybrid early learning interventions, as municipal authorities announced ongoing closures of nurseries and child development centers due to the pandemic and the continued absence of early learning opportunities in virtual spaces for displaced and migrant communities in Peru, as well as for host communities.

Limitations of this study

The limitations of this study mirror many of the challenges facing causal evaluation of hybrid or digital interventions (Lewis & Thacker, 2016). The primary shortcoming of this study is its reliance on monitoring data rather than data collected through a quasi-experimental or experimental design, as well as the absence of baseline data specific to access and learning outcomes. Program-specific limitations include not yet established dose expectations or observe content use due to the population's high mobility. Additional research-specific weaknesses include the use of project-specific measures and reliance on internal processes of data collection. Finally, the findings are not generalizable beyond the specific participating communities. While the results presented here are intended to identify the potential for impactful programming to address access gaps among Venezuelan migrants in Peru, more rigorous research is needed on a mature intervention to determine the causality of the effects.

CONCLUSION

Recent developments around the return to school for children in Peru, particularly the Ministry of Education's strategy for a fruitful return to school in 2021-2022, have critical blind spots. Currently, the plan does not include Venezuelan children as an at-risk group on which to focus efforts. Slots are being assigned in remote public schools that Venezuelan families cannot access once in-person activities begin (Castro, 2021). The absence of an inclusive approach for migrants coupled with a push to increase migration control further restrict Venezuelan families from accessing public services, including critical early childhood learning for their children. Given this continued, and even increasing, marginalization of Venezuelan migrants, there is a growing need to provide early learning opportunities for young children to support their long-term healthy development, provide them with skills to mitigate the effects of adverse childhood experiences stemming from displacement and migration, and help establish a nurturing care environment.

The combined set of hybrid solutions detailed here further confirms the need for early education opportunities for children on the move, demonstrating also that these interventions are of value for children in host communities as well. It highlights the willingness of convened caregivers to use them, given that the resources are flexible enough to meet their family's

needs. While future research is required to establish causal links between remote and hybrid interventions and changes in children's knowledge, the findings here build on emerging evidence on hybrid early learning interventions that lay foundational groundwork for the importance of these interventions in fragile contexts for families affected by displacement to ensure that all children—regardless of nationality or immigration status—have access to critical quality early childhood learning opportunities.

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