Accessible Digital Textbooks:
Creating Digital Tools to Enable Inclusive Education
Jamaica
October 2023
Table of Contents

Acknowledgements .......................................................................................................................... 4
Acronyms and abbreviations .......................................................................................................... 4
Glossary of terms ........................................................................................................................... 4

Executive summary ....................................................................................................................... 5

1. Introduction ................................................................................................................................ 8
   1.1. Background .......................................................................................................................... 8
   1.2. The Accessible Digital Textbooks initiative .................................................................... 10

2. Research questions and methodology ..................................................................................... 14
   2.1. Research questions ............................................................................................................ 14
   2.2. Methodology ..................................................................................................................... 14

3. Findings .................................................................................................................................... 17
   3.1. Pre-user testing: Teacher and student digital skills, and classroom infrastructure readiness .......................................................................................................................................................... 17
     3.1.1. Teachers’ experience of inclusive education and the use of technology .................. 17
     3.1.2. Students’ experience with technology ....................................................................... 18
     3.1.3. Devices and classroom infrastructure for using digital content ............................. 18
   3.2. In-classroom implementation ............................................................................................. 19
     3.2.1 How did children with disabilities interact with Accessible Digital Textbooks? ...... 19
     3.2.2 Teacher-student dynamics around Accessible Digital Textbooks ............................. 20
     3.2.3. Using the Accessible Digital Textbook prototypes to foster inclusion for students with disabilities .......................................................................................................................................................... 21

4. Conclusions and recommendations ........................................................................................... 23

Annex 1 ........................................................................................................................................... 26
Annex 2 ........................................................................................................................................... 26
Annex 3 ........................................................................................................................................... 28
Annex 4 ........................................................................................................................................... 28
Annex 5 ........................................................................................................................................... 29

References ........................................................................................................................................ 30
Acknowledgements

This report was planned and developed by UNICEF’s Latin America and the Caribbean Regional Office (UNICEF LACRO) and the UNICEF Innocenti – Global Office of Research and Foresight (UNICEF Innocenti), under the supervision and guidance of Matt Brossard and Thomas Dreesen of UNICEF Innocenti and Cynthia Brizuela, Julie de Barbeyrac and Tania González of UNICEF LACRO. This report was written by Sophia Torres (UNICEF Innocenti), Marta Carnelli (UNICEF Innocenti) and Rebecca Tortello (UNICEF Jamaica). Qualitative and quantitative data were collected and consolidated by Debbie-Ann Hall, Kiana Beckford and Tamika Thompson with technical support from Annette Piper (BookFusion), Carol Granston (BookFusion), Rebecca Tortello, Sophia Torres and Marta Carnelli.

Special thanks go to the team from the Jamaican Ministry of Education and Youth that accompanied the coordination and implementation of the fieldwork: Vivian Blake and Dionne Gayle from the Special Education Unit.

Valuable comments were provided by UNICEF colleagues, including Alessandra Ipince, Juan-Pablo Giraldo, Auken Tungatarova, Frank van Cappelle and Maija Lyytinen.

Special thanks go to Cynthia Hobbs (Inter-American Development Bank) and Paul Lynch (University of Glasgow) for their review and valuable comments.

Acronyms and abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADT(s)</td>
<td>Accessible Digital Textbook(s)</td>
</tr>
<tr>
<td>CODA</td>
<td>Child of deaf adults</td>
</tr>
<tr>
<td>FGD</td>
<td>Focus group discussions</td>
</tr>
<tr>
<td>IT</td>
<td>Information technology</td>
</tr>
<tr>
<td>MoEY</td>
<td>Ministry of Education and Youth</td>
</tr>
<tr>
<td>OPDs</td>
<td>Organizations for people with disabilities</td>
</tr>
<tr>
<td>UDL</td>
<td>Universal Design for Learning</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>UNICEF Innocenti</td>
<td>UNICEF Innocenti – Global Office of Research and Foresight</td>
</tr>
<tr>
<td>UNICEF LACRO</td>
<td>UNICEF Latin America and the Caribbean Regional Office</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>

Glossary of terms

The terms used in this report are aligned to those presented and used in the UNICEF Inclusive Education Booklets and the WHO ICF-CY.
Executive summary

In the Latin America and Caribbean region, more than 19 million children have a disability, posing barriers to quality education (UNESCO, 2020b; UNICEF, 2021). In Jamaica, disability is a major factor of exclusion from the education system. The latest census data from 2011 showed that children with disabilities were five times more likely to be out of school (27 per cent) than children without disabilities (5 per cent) (UNESCO, 2020a). To address these challenges, Jamaica has worked towards greater access to quality education for all children, starting with the ratification of the United Nations Convention on the Rights of Persons with Disabilities in 2007 and the passing of Jamaica’s Disabilities Act in 2014. However, Jamaica’s Special Education Policy, drafted in 2019, which could reinforce these efforts, has not been approved as of 2023.

Creating an inclusive education environment where all children can learn together regardless of the level of functioning or severity of their disability, requires several types of resources, with accessible materials being essential. The Accessible Digital Textbooks initiative (the ADT initiative) led by UNICEF aims to enable educators to apply the principles of Universal Design for Learning (UDL). The ADT initiative integrates digital textbook content with accessibility features following the principles of UDL to ensure equal access to all learners, including those with disabilities and different learning preferences. The technology and accessibility features enable access to the content for students with visual, hearing, intellectual, motor and learning disabilities, among others.¹

This report presents the results of the Accessible Digital Textbook (ADT) prototypes testing conducted in Jamaica during October and November 2022. The prototypes are the product of a partnership between UNICEF Jamaica, the Ministry of Education and Youth (MoEY) and the ADT technology partner in Jamaica, BookFusion. The production of the prototypes followed a series of activities that included the setting up of a technical committee, capacity-building and teacher training on UDL principles, inclusive education and technology development. The first two prototypes consisted of early childhood education storybooks used in pre-primary and primary schools entitled My Brain is My Boss and Harriet Hen and the Hawk.

The objective of this research was to test the usability and suitability of the first two prototypes and inform the production of new and inclusive versions of existing books, as well as the implementation and use of ADTs in classrooms by students and teachers. The prototypes were tested in five schools, chosen together with the MoEY. In total, 49 students with and without disabilities participated.² During the user testing, the prototypes were used as a teaching tool by eight teachers who guided their students through their use in the classroom. Each teacher together with the students interacted and engaged with the prototypes for two sessions over the course of one month.³

This research report presents the results of this prototype testing in Jamaica in three areas:

1. First, it analyses the familiarity of teachers and students with technology, including their experience utilizing technology to support education and learning.
2. Second, it investigates the pedagogical practices used for inclusive education and to integrate the ADT prototypes as tools to support inclusion and learning.
3. Third, it presents recommendations for improving the prototypes and elements needed for their further development, implementation and scale-up in the education system.

This study is part of longer-term research that examines the implementation of the ADT initiative in multiple countries within the Latin America and Caribbean region. Future research aims to explore the impact of the use of ADTs on both student learning and inclusion on a larger scale. Below are key research findings and related recommendations from the user testing of the ADT prototypes in Jamaica.

1 Books are created in EPUB 3 format, with synchronized accessibility features, such as sign language videos, navigation, audio, audio description of images, subtitles and interactive UDL exercises.
2 Details about the schools selected and students sampled can be found in Annex 1 and Annex 2 respectively.
3 On average, each session lasted 40 minutes. Sessions were scheduled on different days and were coordinated with the teachers considering their availability.
Results

Results from the user testing demonstrated that ADTs can be useful tools to support teachers in their lessons for students, both with and without disabilities. Students with and without disabilities of both genders were enthusiastic and engaged when using the prototypes in the classroom. Teachers indicated that ADT prototypes were useful for managing an inclusive classroom and provided feedback to better incorporate these tools into their daily teaching practice.

Students were observed utilizing accessibility features, including audio voice-over and sign language videos, based on their access needs and learning preferences. Students who interacted directly with the prototypes showed focused engagement with the content and their ability to navigate it at their own pace. Teachers gave support to students with additional needs, such as novice signers, to ensure content comprehension and active participation throughout the sessions.

Recommendations

1. Recommendations for teachers utilizing ADTs and other digital technologies in the classroom

   ■ Prepare and explain the learning objective of the class before introducing the technology.
   ■ In the first class where the technology is used, introduce the ADT and its functionalities clearly.
   ■ As students use the ADT individually or in groups, monitor students during their work, assess comprehension and involve them in activities.
   ■ Optimize desk arrangement in the classroom. Having desks arranged in a ‘U-shape’ enhanced visibility during the prototype testing, aiding classroom management while using the ADT.

2. Recommendations to the MoEY for teacher training and professional development

   ■ Teachers require ongoing professional development opportunities that address inclusive teaching strategies and how to effectively use inclusive technology in the classroom.
   ■ Put the emphasis on practical training by:
     (a) having teachers develop lesson plans that integrate the use of the ADT during the training, and
     (b) increasing the amount of practice time that teachers have with the technology to help them become more comfortable with the content.

3. Recommendations to technology developers to improve ADT functionality and capability

   ■ Make the ADTs easier to find on MoEY platforms.
   ■ Ensure the quality and functionality of all features in the downloadable (offline) version of ADTs.
   ■ Include audio description in the activity sections to make the ADTs fully inclusive.
   ■ Adjust size and contrast of the interpreter in sign language videos to help students better follow the interpreter.
   ■ Include a demonstration video with explanations on how to navigate through the ADT.
4. Recommendations to the Government of Jamaica to enhance the ecosystem for inclusive digital education

- To enhance the implementation of the ADT initiative, provide additional support for managing devices and connectivity in schools and classrooms, more career development opportunities in technology-related fields, and deeper understanding and application of UDL principles.
- Coordinate how to integrate accessible digital materials in lesson planning among teachers, school administrators and ministry officials.
- To enhance inclusive education in Jamaica, integrate the production of accessible learning materials into existing policies and budget arrangements.
- To further strengthen the inclusive education ecosystem in Jamaica, approve the Special Education Policy (2019)

Future research

As the ADT initiative continues to be implemented and scaled up, subsequent research will be crucial to improve the programme and measure its impact on inclusion and learning outcomes. Embedding research into the initiative’s growth will offer valuable insights to address challenges and enhance implementation across diverse contexts in Jamaica. Additionally, ongoing research in multiple countries will allow synthesis of findings, generating comprehensive global knowledge on the use of digital tools for inclusive education.
1. Introduction

1.1. Background

In the Latin America and Caribbean region, more than 19 million children have a disability, which represents 10 per cent of children in the region aged 0 to 17 years (UNICEF, 2021). While school attendance and completion rates have increased steadily over the last 20 years, barriers to access quality education remain too high for children with disabilities (UNESCO, 2020b).

In Jamaica, disability is a major factor of exclusion from education. Among other factors, physical barriers in spaces, limited access to learning materials, as well as stigma and discrimination present significant obstacles for children with disabilities (UNICEF, 2018b). The latest census data (2011) showed that children with disabilities were five times more likely to be out of school (27 per cent) than children without disabilities (5 per cent) (UNESCO, 2020a). Additionally, only 4 per cent of the 785,000 Jamaicans living with a form of disability are registered in the Confidential Register of Persons with Disabilities, posing a challenge for the Government to provide children with disabilities with the necessary support for their education (UNICEF, 2018a).

Despite these challenges, Jamaica has a long track record of working towards greater access to quality education for all children, demonstrated through various initiatives that began with the ratification of the United Nations Convention on the Rights of Persons with Disabilities in 2007. Subsequently, the Disabilities Act was presented in 2014 as the main domestic regulation to protect and enhance the welfare of people with disabilities in the country. Furthermore, the National Education Strategic Plan: 2011–2020 aimed to provide inclusive education services and the National Standards Curriculum framework positioned inclusivity as a core value in 2016. However, the Special Education Policy (2019), which could reinforce these various efforts, has not been approved as of 2023. This policy aims to create a model where children with and without disabilities learn together in the same classroom rather than in separate settings (UNESCO, 2021).

Inclusive education requires that all schools are prepared to welcome children with disabilities and guarantee appropriate learning opportunities and participation (WHO and UNICEF, 2022). Creating an inclusive education environment where all children can learn together regardless of the level of functioning or severity of their disability requires accessible infrastructure, disaggregated data and dedicated educational resources. These resources include accessible learning and assessment materials, and teacher training to effectively utilize these materials and practices. Figure 1 presents relevant data about inclusion within Jamaica’s education system. Despite the enactment of the Copyright (Amendment) Act in 2015 to facilitate content adaptation into accessible formats, adapting educational content in Jamaica remains challenging without further domestic regulation or the ratification of the Marrakesh Treaty, an international legal instrument designed to facilitate access to copyrighted documents for persons who are blind and visually impaired.

---

4 The Confidential Register of Persons with Disabilities is administered by the Jamaica Council for Persons with Disabilities, which falls under the Ministry of Labour and Social Security.
5 The Disabilities Act adopted the concept of progressive realization and came into full effect in February 2022.
6 The Marrakesh Treaty is a treaty on copyright adopted in Marrakesh, Morocco on 27 June 2013. As of February 2023, the treaty had 92 Contracting Parties covering 118 Member States of the World Intellectual Property Organization (the numbers differ because the European Union joined as a block).
Figure 1: Inclusion ecosystem in Jamaica’s education system

<table>
<thead>
<tr>
<th>Feature</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible pedagogical models</td>
<td>76%</td>
</tr>
<tr>
<td>Some reasonable accommodations</td>
<td>59%</td>
</tr>
<tr>
<td>Trained teachers in inclusive education</td>
<td>58%</td>
</tr>
<tr>
<td>Annual mechanism to address students’ learning difficulties</td>
<td>47%</td>
</tr>
<tr>
<td>Facilitates visual screening for students</td>
<td>25%</td>
</tr>
<tr>
<td>Facilitates hearing screening for students</td>
<td>10%</td>
</tr>
<tr>
<td>Accessible education materials</td>
<td>7%</td>
</tr>
<tr>
<td>Sign interpreters or dictation software</td>
<td>2%</td>
</tr>
</tbody>
</table>

Source: WELBIN (2022)

Digital learning can be a powerful tool to enable inclusion within classroom settings. Designing digital learning content with accessibility features, such as text to speech, closed captioning, alternative text descriptions and customizable display settings, can allow content to be accessed by students with different access needs and learning preferences. The use of accessible digital learning tools in classrooms can also allow teachers to incorporate more inclusive practices into their pedagogy. Providing all these accessibility features for the same content can foster active participation and engagement for children with visual disabilities, hearing disabilities, intellectual or developmental disabilities, learning disabilities and those who prefer non-visual access to information. While the Ministry of Education and Youth (MoEY) has started to provide videos in Jamaican Sign Language and digitized books with audio and interactivity, accessibility requirements for public procurement of technology and learning materials from publishers are not yet enforced. Implementing such requirements with legislative support can bolster Jamaica’s digital learning environment, which has shown improvement but is not yet sufficient to provide for all children’s needs.

Access to digital devices and connectivity are prerequisites to make use of digital content in schools. In Jamaica, even prior to the COVID-19 pandemic, the Government made significant steps to provide access to digital devices and connectivity for school-age children in public schools. Programmes such as Tablets in Schools have delivered 150,000 digital devices for education to the most vulnerable schools over recent years (MoEY, 2023).
However, while most secondary schools were provisioned with digital devices, the same level of devices were not provided to primary schools. To address this issue, some primary schools have implemented the Bring Your Own Device programme, which allows students to bring their own devices to school for educational purposes. As for improving connectivity, programmes such as the Three-Tier Plan have contributed to connecting 74 per cent of schools to the internet (MoEY, 2022). However, many schools have cited problems with low bandwidth and frequent service interruptions (Chapelet, 2022). Nevertheless, the implementation of these programmes, combined with teacher training on digital skills and technology for learning, have contributed to developing a digital learning environment that sets the foundation for implementing disability-inclusive solutions. Building on Jamaica’s commitment to fostering inclusive education and its efforts to invest in digital learning, the country joined the Accessible Digital Textbooks initiative (the ADT initiative) in 2020 to develop digital tools to support inclusive education.

1.2. The Accessible Digital Textbooks initiative

The ADT initiative is a collaboration between UNICEF, ministries of education, organizations for people with disabilities (OPDs), publishers and technology partners to build inclusive digital learning tools known as Accessible Digital Textbooks (ADTs), enabling children with and without disabilities to learn together in the same classroom. The global ADT initiative, launched in 2014, emerged from extensive consultations and workshops led by UNICEF, involving representatives from Argentina, Brazil, India, Kenya, Paraguay and the United States of America. These consultations resulted in the development of guidelines to support ministries of education, publishers, technology and content developers, teachers and implementers to digitally adapt textbooks based on Universal Design for Learning (UDL) principles to ensure accessibility for all learners. The goal of the ADT initiative is to enable inclusive education systems by developing tools that can make inclusive teaching and learning more achievable in classrooms.

Box 1. What is an accessible digital textbook?

It is an adapted digital version of a curriculum-based textbook that follows Universal Design for Learning principles and gives all children, including those with disabilities, access to educational content in alternative formats, such as narration (text to speech), sign language videos, interactive activities and others, to accommodate all different learning preferences and access needs.

The Accessible Digital Textbooks initiative is part of an inclusive digital transformation of education in Jamaica, so that all children can learn together in the format that best suits their needs. It enables actors in the education system to harness the potential of inclusive digital education to improve learning outcomes and skills development for all children.

7 The provision of digital devices is done by the MoEY, the Ministry of Science, Energy and Technology, and other partners, such as e-Learning Jamaica Company Limited.
In each country, the ADT initiative follows several stages to design and develop ADTs that fit the context, while creating a local ecosystem for their successful production, quality assurance and implementation in schools. Across the ADT initiative, research led by the UNICEF Innocenti – Global Office of Research and Foresight (UNICEF Innocenti) is embedded into each step of the process to generate evidence and inform improvements in the programme over time. The staged approach to implementation and research is shown in Figure 2.

**Figure 2:** Accessible Digital Textbook implementation and research stages

The ADT process starts with the establishment of an ADT Technical Committee, comprising UNICEF, the ministry of education, OPDs, teachers of children with disabilities, technology partners and publishers. After joining the ADT initiative in 2020, Jamaica established its ADT Technical Committee consisting of UNICEF Jamaica, the MoEY, the Jamaica Library Service, the Jamaica Association for the Deaf, the Salvation Army School for the Blind and Visually Impaired, and BookFusion as the technology partner. This committee selected *My Brain is My Boss* and *Harriet Hen and the Hawk*, storybooks approved by the MoEY for early childhood- and primary-level education, to be developed into ADT prototypes. Figure 3 showcases images of the prototypes and their key accessibility features. Following validation of these prototypes using a quality content and accessibility checklist, user testing was conducted in five schools during October and November 2022 to assess their usability and suitability in schools.
Figure 3: Images of the Accessible Digital Textbook prototypes

My Brain is My Boss (UNICEF)

My brain is my boss!

My brain tells my body what to do.

Harriet Hen and the Hawk (UNICEF)

Harriet loves her chicks and is very proud of them.

Early in the morning, they go for a walk through the farmyard.

They go under the ackee trees. They go past the yam hills.
This report aims to provide insights into the implementation of the ADT initiative in Jamaica based on implementation research conducted during ADT user testing. The research led by UNICEF Innocenti is part of a regional effort coordinated by the UNICEF Latin America and the Caribbean Regional Office (UNICEF LACRO) working across six countries, including Colombia, the Dominican Republic, Nicaragua, Paraguay and Uruguay. Jamaica is the third country to undergo ADT prototype testing in the region, following research undertaken in Paraguay (Carnelli, Dreesen and Pacheco, 2022) and Uruguay (Torres, et al., 2023).
2. Research questions and methodology

2.1. Research questions

The user testing of the ADT prototypes focused on the following research questions:

- How do students with and without disabilities interact and engage with the ADT prototypes?
- What are the challenges and best practices undertaken by students and teachers utilizing the ADT prototypes in the classroom?
- How do teachers use the prototypes in their teaching practice to engage students with different learning preferences?
- How can pedagogical practices and teacher support be enhanced with ADTs?
- What is needed to embed the use of ADTs within Jamaica’s education system?

2.2. Methodology

To address the research questions presented above, user testing was conducted with students and teachers to gather information on the use of ADTs in classrooms. The user testing of the ADT prototypes combined and triangulated different data sources, including classroom observations, teacher interviews and focus group discussions (FGD) to identify best practices and challenges to utilizing ADTs in classrooms.

Data collection instruments were co-developed, adapted and validated by UNICEF Jamaica, UNICEF LACRO, UNICEF Innocenti, the MoEY and BookFusion. The research protocol and instruments received ethical approval from the Ethics Review Board of the Health Media Lab Independent Review Board. The instruments applied, the detailed information of which is presented in Figure 4, included the following:

- **Pre- and post-teacher training surveys** to assess teachers’ familiarity with technology before the user testing, their experience with inclusive education, their perception of technology-enhanced education and to gather feedback on the training they received.
- **FGD with groups of four to seven students** from each of the participating schools. The pre-implementation FGD focused on students’ familiarity with digital devices in learning, while the post-implementation FGD explored their experience with using ADTs in the classroom.
- **Structured classroom observations** were conducted to gain insight into classroom dynamics and the use of ADTs. Classroom observations focused on interactions between students and teachers, students’ verbal and non-verbal expressions, documenting the time teachers dedicated to using the prototypes in class and assessing the quality of teaching practices using an inclusive approach.
- **Semi-structured interviews with teachers** were used to learn about their experience and feedback at the end of the user testing. The interviews covered their experiences with the training, use of the prototypes in the classroom and their insights on improvements for further implementation.

---

8 More information on ethical procedures can be found in Annex 3 and Annex 4.
FGD and classroom observations were conducted and transcribed by BookFusion researchers during October and November 2022. Qualitative and quantitative data were triangulated from multiple sources to validate findings and ensure that lessons learned included different perspectives. To code, organize and analyse the data collected, thematic content analysis was performed.

Sample and Accessible Digital Textbook prototype testing procedures

Five schools were selected for the prototype testing by the MoEY and UNICEF Jamaica. The selected schools were required to have adequate infrastructure and the necessary devices for students to access the ADT prototypes. Among these five schools, four were special schools catering to students with specific disabilities: two for learners who are deaf and hard of hearing; one for blind and low vision learners; and one for learners with intellectual disabilities. The fifth school was considered inclusive, but mainly accommodated children with motor and learning disabilities in the Special Education Unit of the regular school. This school followed an integration model where children with disabilities are placed in separate classes with special education teachers, but share the same premises. Throughout this report, the term ‘inclusive’ will be used to refer to such schools, as it is commonly used in Jamaica and other countries to describe this approach.

The research sample included 49 students across the five schools, with class sizes ranging from 4 to 15 students. Students primarily fell within the age range of 6–8 years and attended primary school grades. Five older children with varying levels of functioning and disability severity also engaged with the prototypes as part of the testing. Table 1 below shows a summary of the 49 participants. For a comprehensive breakdown of participants by data collection activity, please refer to Annex 1 and Annex 2.

Table 1: Summary of participating students – Accessible Digital Textbook user testing

<table>
<thead>
<tr>
<th>School</th>
<th>Number of students by type of disabilities</th>
<th>Grade</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclusive school</td>
<td>• 13 students with learning disabilities</td>
<td>5</td>
<td>• 10 boys</td>
</tr>
<tr>
<td></td>
<td>• 1 student with learning and motor disabilities</td>
<td></td>
<td>• 6 girls</td>
</tr>
<tr>
<td></td>
<td>• 1 student with cerebral palsy and motor disabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1 student without disabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special school (visual disabilities)</td>
<td>• 9 students with visual disabilities</td>
<td>3</td>
<td>• 4 boys</td>
</tr>
<tr>
<td></td>
<td>• 4 students without disabilities</td>
<td></td>
<td>• 5 girls</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• N/A on students without disabilities</td>
</tr>
</tbody>
</table>
### Table

| Special school (intellectual disabilities) | • 5 students with severe intellectual disabilities | 9 | • 3 boys
| • 2 students with hearing disabilities | | 1 | • 2 girls
| • 1 student with hearing disabilities | | 2 | • All students were girls
| • 1 student with hearing disabilities and a sensory processing disorder | | | |
| • 3 students with hearing disabilities | | 5 | |
| Special school (hearing disabilities) | • 3 students with hearing disabilities and learning disabilities | 1 | • 4 boys
| • 4 students with hearing disabilities and learning disabilities | | 2 | • 4 girls
| • 1 student is a child of deaf adults (CODA) | | | |

A group of eight teachers took part in the ADT prototype testing within classrooms and underwent a two-day (14-hour) training programme. The training programme aimed to equip teachers with the necessary technological and pedagogical skills for effective integration of the prototypes. It combined theory and practice components, allowing teachers to create comprehensive lesson plans incorporating the ADT prototypes. Each group of teachers and students used the prototypes in the classroom during two sessions over a one-month period, accessing them through devices such as tablets, laptops and projectors, depending on the availability of resources on the school premises. On average, each session lasted 40 minutes.

### Limitations

This research was conducted during the prototype testing stage of the ADT initiative in Jamaica. Consequently, the sample size and duration of the user testing was deliberately kept short to test the ADT initiative in a controlled environment, aiming to inform subsequent use of the tools in classrooms and improvements that could be made in the new technology. This short time frame restricts the extent to which definitive conclusions can be drawn from the findings concerning the use of the ADT prototypes by students with and without disabilities, and teachers. Such conclusions would require longer-term observations and ongoing research, which will be addressed in the initiative’s next stage. Also, due to the small sample size and short time frame, this research did not explore the impacts of the programme on learning outcomes and inclusion. In the initiative’s next stage, mixed-methods research will be applied to measure the impact of ADTs on learning outcomes and inclusion.
3. Findings

3.1. Pre-user testing: Teacher and student digital skills, and classroom infrastructure readiness

Before implementing the ADT prototypes in classroom settings, data was collected on:

- Teachers’ and students’ familiarity with digital devices
- Teachers’ familiarity with inclusive practices and previous experience with students with disabilities
- The schools’ information technology (IT) infrastructure available for the user testing

3.1.1. Teachers’ experience of inclusive education and the use of technology

While respondents reported experience working with children with disabilities and special education training, the pre-training teacher survey found that two of the eight respondents had not received recent formal training on inclusive education. As shown in Figure 5, respondents expressed willingness to create individualized adjustment plans, indicating their commitment to personalized and inclusive practices. However, half of the teachers disagreed with using a unified inclusive curriculum for children with and without disabilities.

**Figure 5:** What do you do (or what would you do) to teach a student with disability?

<table>
<thead>
<tr>
<th>Action</th>
<th>Number of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design an adjustment plan</td>
<td>8</td>
</tr>
<tr>
<td>Implement a specific methodology</td>
<td>7</td>
</tr>
<tr>
<td>Offer materials and suggestions</td>
<td>5</td>
</tr>
<tr>
<td>Suggest a support team</td>
<td>2</td>
</tr>
<tr>
<td>Peer tutoring</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: Pre-training teacher survey. Note: Numbers represent the number of teachers.

All eight teachers trained were comfortable with using digital devices, including tablets, smartphones and computers; six out of eight reported using these types of devices actively in the classroom with their students. Respondents reported mainly using computers and projectors to present and explain content to children with and without disabilities in the classroom. Furthermore, seven out of the eight respondents had received training on how to use technology for teaching within the last two years.⁹

⁹ For example, the Jamaica Teaching Council provided a course on [Blended Learning in the Post-COVID Classroom](#) to develop teachers’ digital skills for teaching.
The integration of technology and accessible content in classrooms required practice and continuous support to enrich the learning experience of children with and without disabilities. Out of the eight respondents, seven reported feeling comfortable using the ADT prototypes after completing the training. However, after the user testing (described in section 3.2), some teachers mentioned needing additional support and that the skills learned during the training did not seamlessly transfer to the classroom environment. Teachers emphasized the need for more practice time to become proficient with the new learning tools.

**Teachers also expressed the need for support in other areas to effectively use the prototypes in the classroom.** Specifically, the identified areas included increased support from school administrators in terms of device scheduling and management, more career development opportunities in technology-related fields, and deeper understanding and application of UDL principles.

### 3.1.2. Students’ experience with technology

Ensuring that students have the digital skills to navigate and use the ADT prototypes is a necessary prerequisite for them to benefit from the initiative. Pre-implementation FGD were conducted in each of the five schools participating in the user testing to understand students’ digital skills. All participating students reported using digital devices daily, mainly tablets, for both entertainment and learning purposes. Entertainment activities included watching movies, playing games and engaging with platforms such as TikTok and YouTube. For learning purposes, students mentioned watching educational videos, conducting research and completing classwork.

> “I use the device every day. Yes, every day to watch movies. One day, I use it for classwork.”
> — Teacher interpreting for deaf student

Students frequently use digital devices, finding them easy to use. However, students with visual or hearing disabilities mentioned the need for assistance from parents, caregivers, teachers or specialized apps. For example, low vision students highlighted the importance of utilizing the Alexa voice assistant to access content, such as playing a YouTube video and asking questions.

> “Well, I cannot go on YouTube by myself because I cannot navigate through the tablet. So, sometimes I just ask Alexa.”
> — Student with a visual disability

### 3.1.3. Devices and classroom infrastructure for using digital content

Overall, the availability of digital devices for teachers and students in schools created a favourable environment for implementing the ADT prototypes. Most teachers in the participating schools had access to a laptop and projector in the classroom. In the case of students, some had received tablets for individual or shared use through the Tablets in Schools programme, while others brought their own devices under the Bring Your Own Device programme.

While most schools in Jamaica are equipped with digital devices, there are difficulties in device monitoring and management at the school level. Some students had lost or broken the tablets provided by the school and others lacked devices in their classrooms, resulting in teachers having to rely on their personal devices. A careful diagnosis of IT infrastructure available in schools is crucial to understand how devices are used by students and teachers, identify support needs and develop a monitoring plan where none exists. Also, developing a clear plan for managing, storing, and repairing or replacing technology is often overlooked, but essential to ensure the success of technology-enabled programmes (Dreesen, et al., 2021).

10 More information on the ownership of the devices used can be found in Annex 5.
3.2. In-classroom implementation

Throughout the user testing, research focused on three main questions:

1. How did students interact with the ADTs?
2. How did the use of the ADTs influence pedagogy and classroom dynamics?
3. How did teachers integrate the ADTs during their lessons?

Each school conducted two sessions using the prototypes. While two schools used either *My Brain is My Boss* or *Harriet Hen and the Hawk*, the other three schools used both storybooks.\(^{11}\) This section presents the findings for all groups of students, highlighting the observed differences in their experiences with the prototypes based on their respective type of disabilities.

3.2.1. How did children with disabilities interact with Accessible Digital Textbooks?

The ADT prototypes were used both individually and shared among students in classrooms. In three schools, students had direct interaction with the prototypes as they had access to both connectivity and digital devices. In these schools, the devices were mostly used on a shared basis, with students taking turns to navigate the prototypes. In the remaining two schools, due to lack of connectivity, the teacher shared the content using a projector. In these instances, direct interaction with the prototype was not possible during classroom observations and students interacted with the prototypes indirectly through the projector. In such cases, teachers activated the accessibility features they considered appropriate to facilitate class development.

Most students were animated and eager to use the prototypes in the classroom. Those who interacted directly with the prototypes via tablets or smartphones mentioned that they felt comfortable and found them easy to use and useful for their learning. Some students indicated that they had found a learning material that they could use independently and were also interested in learning how to use it on their own.

> The students appeared interested in what was being shown, albeit the fact that some had a hard time staying focused for the entire duration, they were excited about looking at and listening to the prototype.
> — Classroom observation data (school for students with intellectual disabilities)

Students who directly interacted with the prototypes demonstrated higher levels of focus on the lesson compared to those using the prototypes through a projector. These students were observed navigating the content at their own pace and using the accessibility features of their preference. Most students were excited and animated about using the prototypes, whether directly or indirectly, as a new learning tool. There were a few exceptions observed, especially among some students with intellectual disabilities who found it more difficult to interact with the prototypes. Some students with hearing disabilities were novice signers and, therefore, needed further teacher support to get fully engaged in the lesson.

Spontaneous peer support was observed among students as they assisted each other in using the prototypes without guidance from teachers or IT assistants. Also, due to their familiarity with digital devices, most students did not encounter any major challenges when interacting with the prototypes.

> Two of the Grade 5 girls went through the entire prototype independently, then completed the questions by themselves. They assisted the other Grade 5 girl who was struggling to navigate the prototype.
> — Classroom observation data (school for students with hearing disabilities)

---

11 For more information on how participating schools used both prototypes, see Annex 5.
3.2.2. Teacher-student dynamics around Accessible Digital Textbooks

**Teachers followed the lesson plans developed during and after their training to integrate the prototypes using a blended approach,** combining activities involving ADTs with traditional classroom methods, such as asking the class questions and receiving answers. In the two schools where direct student interaction with the prototypes was not possible, more traditional methods were used. However, regardless of the interaction level, most teachers successfully blended non-digital learning activities with the prototypes’ content and accessibility features. This included using the audio voice-over feature for content listening and facilitating group activities through the shared projection of the prototypes.

*After the students listened to the story, the teacher had a brief question and answer session. She also allowed the students to propose a new ending for the story and dramatize some.*

— Classroom observation data (inclusive school)

**Teachers implemented diverse strategies to foster engagement and collaboration among all students in the classroom.** They used UDL principles and the ADT prototypes to explain concepts through multiple approaches, establishing connections between the content and students’ prior knowledge. For example, while students with hearing disabilities used sign language to participate, students with severe intellectual disabilities expressed themselves with body movements when verbal expression was challenging for them.

*A student with cerebral palsy was asked to demonstrate what the brain helped him to do. He was non-verbal, so he was asked to do movements to show how he understood the question.*

— Classroom observation data (inclusive school)

**Presenting lesson objectives and explaining the utility of the prototypes to achieve them is a practice that helped students focus, and was done by teachers in two of the participating schools.** This highlighted the need to include and reinforce practical training for lesson planning with ADTs as part of teachers’ professional development.

**Unstable connectivity presented a significant challenge in two out of the five schools, as the offline option of the prototypes was not yet available.** Connectivity issues were encountered specifically in those specializing in visual and hearing disabilities. In both cases, students could not interact directly with the prototypes, and instead relied on the teacher’s projected version to access the content. This situation highlighted the importance of offline access to the prototypes, which would have allowed students and teachers to access the content even when there is limited connectivity.

**IT support staff in schools had a key role in preparing the classrooms, which allowed students to focus on using the ADT prototypes.** In the three participating schools where IT support was available, IT assistants helped students to set up and launch devices, as well as to access the prototypes, resolving connectivity issues and assisting teachers with laptops and projectors. As teachers and learners become more proficient and comfortable with using digital devices for education, the demand for support is likely to decrease (Lynch, Singal and Francis, 2021). Still, it is important to provide initial support and training to ease the transition and empower teachers and students to effectively use digital tools in classroom settings.

3.2.3. Using the Accessible Digital Textbook prototypes to foster inclusion for students with disabilities

**The accessibility features allowed students with different access needs and learning preferences to engage with the content, allowing teachers to focus their attention on supporting students who were falling behind.** For example, some students with hearing disabilities were novice signers and could not fully understand the sign language videos included in the prototypes. However, with the support of their teachers who signed at a slower pace, these students were able to understand the content.
Teachers made efforts to select accessibility features that best catered to the access needs and learning preferences of their students, whether they were working individually or in groups.

Teachers spent most of the time with the students who were novice signers. The two teachers encouraged spelling and for those students who could sign but not very comfortably, they complained that they missed some information in the prototype or did not understand what was being signed, as according to the teacher the sign level “was too high.” She signed simpler for the two students who were affected.
— Classroom observation data (school for students with hearing disabilities)

Teachers and, in some cases, caregivers supported students with learning disabilities who had difficulties maintaining concentration during the lesson and helped them to select the accessibility features that catered to their learning preferences. Elements such as changing screen brightness or the volume of the audio voice-over were shown to be crucial for keeping these students engaged while using the prototypes in the classroom.

Teachers applied different strategies to enhance students’ participation when using the ADT prototypes. Considering the type of disability their students had, the following strategies were observed:

- Students with learning disabilities were encouraged to elaborate on other students’ responses.
- Students with visual disabilities were encouraged to answer the questions and activities verbally.
- Students with intellectual disabilities were encouraged to develop their personal thoughts and individual thinking was emphasized.
- Students with hearing disabilities were encouraged to sign in response to questions and activities. Teachers also provided individual support for novice signers.

Teachers mentioned being excited and satisfied with using the prototypes to accommodate different access needs and learning preferences of students. However, they initially felt anxious introducing a new tool into the classroom. The prototypes were found useful, and some teachers showed interest in having additional curriculum-prescribed textbooks and reading plans available in this format. They also acknowledged the need for more time to test and design lesson plans integrating technology. Despite the challenges, teachers ended the activities with a positive opinion about the use of ADTs for students with and without disabilities.

Overall, teachers and students were satisfied with the ADT prototypes. After the user testing sessions, teachers rated the experience as excellent or good, expressing their likelihood to continue using the prototypes in the future. Four out of the five teachers interviewed believed that the prototypes’ content and accessibility features would be beneficial for their daily teaching activities. As for students, they eagerly shared what they had learned and actively participated in the activities by using various communication methods, as previously described.
4. Conclusions and recommendations

The ADT initiative aims to build inclusive digital tools that enable children with and without disabilities to learn together in the same classroom. The initiative follows several stages to design and develop ADTs that fit each country's context, while building an ecosystem for successful production and implementation within the formal education system. Active in six countries in Latin America and the Caribbean (Colombia, the Dominican Republic, Jamaica, Nicaragua, Paraguay and Uruguay), the initiative conducts research to foster inclusive learning in the region and globally. This report presents findings from Jamaica's ADT user testing in five schools to inform progress in the initiative as it develops and scales up.

Overall, the user testing demonstrated that ADTs can be useful tools to support teachers in their lessons for students, both with and without disabilities. Students with and without disabilities of both genders were enthusiastic and engaged when using ADTs in the classroom. Teachers indicated that the ADT prototypes were useful for managing an inclusive classroom and provided feedback to better incorporate these tools into their daily teaching practice.

Students were observed utilizing accessibility features including audio voice-over and sign language videos based on their access needs and learning preferences. Students who interacted directly with the prototypes showed focused engagement with the content and the ability to navigate it at their own pace. Teachers gave support to students with additional needs, such as novice signers, to ensure content comprehension and active participation.

Recommendations are provided below to inform tangible actions in the following areas:

1. ADT and digital learning use in the classroom
2. Teacher training and professional development
3. Digital education ecosystem development
4. Features and functionality of the ADT content and technology

1. Recommendations for teachers utilizing an ADT and other digital technologies in the classroom, based on practices observed during the ADT user testing

- **Prepare and explain the learning objective of the class before introducing the technology.** This helps organize the class and keep students focused. For example, teachers can introduce the topic using a short story or dialogue before going over the same topic utilizing the technology.

- **In the first class where the technology is used, introduce the ADT and its functionalities clearly.** It is particularly important to spend time explaining each accessibility function and to allow time for students to interact with it before using it during the lesson.

- **While students use the ADT individually or in groups, monitor students during their work, assess comprehension and involve them in activities.**

- **Optimize desk arrangement for all students to be able to engage and follow classroom activities using the ADT.** Observations found that a ‘U-shaped’ arrangement of desks allowed the teacher to easily view all students, interact, and facilitate classroom activities and interactions while using the ADT prototypes.
2. Recommendations to the MoEY for teacher training and professional development

- Teachers require ongoing professional development opportunities that address inclusive teaching strategies and leverage the effective use of technology. These training areas should help to equip teachers with the necessary knowledge and skills to adapt their teaching methods to meet the diverse learning preferences of their students, create inclusive classroom environments, enhance pedagogical techniques and harness the potential of technology for inclusion.

- Combine theoretical instruction with practical activities, focusing on UDL principles and the integration of the ADT prototypes in the classroom. For the ADT user testing in Jamaica, the training was based on feedback obtained during the teacher training programme conducted in Paraguay in 2021 (Carnelli, Dreesen and Pacheco, 2022). The following are key practices taken and recommendations for future trainings:
  - Design and develop lesson plans integrating ADT prototypes in different classroom settings. These lesson plans designed with teachers during the training can be further refined for implementation during user testing and beyond.
  - Increase the time of training to allow additional practice time for teachers to become comfortable using the technology and content. In Jamaica, teachers are already experienced in using technology within their classroom, giving them a strong foundation for incorporating the prototypes. However, they expressed the need for additional practice time to be able to incorporate ADTs in classroom activities during the training.

3. Recommendations to technology developers to improve ADT functionality and capability

- Teachers and students who participated in the user testing provided feedback about the prototypes’ content and functionality to be considered for the development of new books, further implementation and scale-up of the ADT initiative:
  - Make the ADTs easier to find on MoEY platforms so that teachers and students can access them rapidly.
  - Ensure the quality of the downloadable version of the prototypes to avoid situations where prototypes are not fully downloaded or where accessibility features no longer work.
  - Include audio description in the activity sections to make the prototypes fully accessible and give students the opportunity to express what they have learned in class.
  - Adjust size and contrast of the interpreters in sign language videos to help students with hearing disabilities better follow the interpreter and effectively use the accessibility features offered by the prototypes.
  - Include a demonstration at the beginning with explanations on how to navigate the prototypes as some students, mainly those with intellectual disabilities, may have trouble with initial engagement with the prototype.

4. Recommendations to the Government of Jamaica to enhance the ecosystem for digital education

- To enhance the implementation of the ADT initiative, provide additional support for managing devices and connectivity in schools and classrooms. While digital learning programmes exist in many schools, additional efforts are needed to facilitate ADTs in a classroom environment. Schools should prioritize connectivity and device management plans, including maintenance, monitoring and scheduling of technology use to ensure they are charged and ready for use when needed. Budgets must also consider both one-time and recurring costs associated with IT equipment.
Coordinate how to integrate accessible digital materials in lesson planning among teachers, school administrators and ministry officials. User testing highlighted the need for teachers to have dedicated practice time to integrate ADTs into their lessons plans. In terms of technology, action plans should be developed by school administrators to manage and monitor its usage in classrooms. Also, collaborating with the MoEY ensures prototype alignment with the curriculum, but further guidance is required for its effective use across diverse schools.

To enhance inclusive education in Jamaica, integrate the production of accessible learning materials into existing policies and budget arrangements. Leveraging the strong foundation of current inclusive education initiatives, such as teacher training and IT infrastructure support, the effective scaling of efforts can be achieved, reaffirming the commitment to providing inclusive education for all students.

To further strengthen the inclusive education ecosystem in Jamaica, approve the Special Education Policy (2019). Legislative support is needed to transition from a segregated to an inclusive education model, ensuring the availability of accessible infrastructure, disaggregated data and educational resources.

Future research

As the ADT initiative continues to be implemented and scaled up, subsequent research will be crucial to improve the programme and measure its impact on inclusion and learning outcomes. Embedding research into the initiative’s delivery and expansion will enable decision-makers to gain insights into the challenges and improve its implementation across diverse contexts in Jamaica. Additionally, as research continues in multiple countries, this will allow for synthesis of findings to generate regional and global knowledge on the use of digital tools for inclusive education.
Annex 1

Table 2: Participating schools

<table>
<thead>
<tr>
<th>Participating educational centre</th>
<th>Type of environment</th>
<th>Levels</th>
<th>Type of school (location)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclusive school</td>
<td>Integration (learning and motor disabilities in Special Education Unit in regular school)</td>
<td>Primary level</td>
<td>Urban school</td>
</tr>
<tr>
<td>Special school</td>
<td>Segregated (visual disabilities)</td>
<td>Early childhood to secondary level</td>
<td>Urban school</td>
</tr>
<tr>
<td>Special school</td>
<td>Segregated (intellectual disabilities)</td>
<td>Primary to secondary level</td>
<td>Urban school</td>
</tr>
<tr>
<td>Special school</td>
<td>Segregated (hearing disabilities)</td>
<td>Early childhood to primary level</td>
<td>Rural school</td>
</tr>
<tr>
<td>Special school</td>
<td>Segregated (hearing disabilities)</td>
<td>Early childhood to secondary level</td>
<td>Urban school</td>
</tr>
</tbody>
</table>

Annex 2

Table 3: Students participating in the user testing – General

<table>
<thead>
<tr>
<th>School</th>
<th>Observation 1</th>
<th>Observation 2</th>
<th>Focus group 1</th>
<th>Focus group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade</td>
<td>Number of students</td>
<td>Grade</td>
<td>Number of students</td>
</tr>
<tr>
<td>Inclusive school</td>
<td>5</td>
<td>15</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Special school (visual disabilities)</td>
<td>3</td>
<td>10</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Special school (intellectual disabilities)</td>
<td>9</td>
<td>4</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Special school (hearing disabilities)</td>
<td>1, 2, 5</td>
<td>2, 2, 2</td>
<td>1, 2, 5</td>
<td>2, 2, 3</td>
</tr>
<tr>
<td>Special school (hearing disabilities)</td>
<td>1, 2</td>
<td>3, 5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>School</td>
<td>Observation 1</td>
<td>Observation 2</td>
<td>Focus group 1</td>
<td>Focus group 2</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Inclusive school</td>
<td>• Of the 15 students, 9 were boys and 6 were girls.</td>
<td>• Of the 15 students, 10 were boys and 5 were girls.</td>
<td>• All 5 students were boys.</td>
<td>• Of the 5 students, only 1 was a girl.</td>
</tr>
<tr>
<td></td>
<td>• Of the 15 students, 2 students had motor disabilities in addition to having learning disabilities. They used a wheelchair to move around.</td>
<td>• Of the 15 students, 1 student had cerebral palsy and was wheelchair-bound, and 1 student from the regular classroom was invited to participate.</td>
<td>• All 5 students had a learning disability, and 1 of them had a speech impediment too.</td>
<td>• All students had a learning disability, except for the girl who had no disability.</td>
</tr>
<tr>
<td>Special school (visual disabilities)</td>
<td>• Of the 10 students, 4 were not blind or visually impaired.</td>
<td>• Of the 9 students, 4 were boys and 5 were girls.</td>
<td>• Of the 4 students, 2 were boys and 2 were girls.</td>
<td>• All 5 students were girls and blind.</td>
</tr>
<tr>
<td></td>
<td>The school advised that students are welcome to attend the school even if they do not have a disability. Some students attend because of the opportunity to board.</td>
<td>• All 9 students were blind.</td>
<td>• Of the 4 students, the 2 boys had no disability.</td>
<td></td>
</tr>
<tr>
<td>Special school (intellectual disabilities)</td>
<td>• Of the 4 students, 3 were boys and 1 was a girl.</td>
<td>• Of the 5 students, 3 were boys and 2 were girls.</td>
<td>• Of the 3 students, 3 were boys and 1 was a girl.</td>
<td>• All students had an intellectual disability.</td>
</tr>
<tr>
<td></td>
<td>• All students had an intellectual disability. In particular, 1 girl had autism.</td>
<td>• All students had an intellectual disability.</td>
<td>• All students had an intellectual disability.</td>
<td>• All students had an intellectual disability.</td>
</tr>
<tr>
<td>Special school (hearing disabilities)</td>
<td>• All students were girls.</td>
<td>• All students were girls.</td>
<td>• All students were girls and all had a hearing disability.</td>
<td>• All students were girls and all had a hearing disability.</td>
</tr>
<tr>
<td></td>
<td>One of the students had a sensory processing disorder aside from the hearing disability.</td>
<td>• Grade 1: students were just learning to sign.</td>
<td>• Grade 1 and 2 girls were just learning to sign.</td>
<td>• Grade 1 and 2 girls were just learning to sign.</td>
</tr>
<tr>
<td></td>
<td>• Grade 1: students were just learning to sign.</td>
<td>• Grade 2: 1 student wore a hearing aid and the other had an additional sensory processing disorder.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Grade 2: 1 student wore a hearing aid and the other had an additional sensory processing disorder.</td>
<td>• Grade 5: no major details.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special school (hearing disabilities)</td>
<td>• Of the 8 students, 4 were boys and 4 were girls.</td>
<td>• Of the 4 students, 3 were girls and 1 was a boy.</td>
<td>• Of the 6 students, 3 were girls and 2 were boys.</td>
<td>• Of the 4 students, 3 were girls and 1 was a boy.</td>
</tr>
<tr>
<td></td>
<td>• Almost all students had a learning disability too.</td>
<td>• Of the 4 students, 1 had no disability (CODA) and the others were deaf.</td>
<td>• All students had a learning disability too.</td>
<td>• Of the 4 students, 1 had no disability (CODA) and the others were deaf.</td>
</tr>
<tr>
<td></td>
<td>• There was a Grade 2 CODA student.</td>
<td>• There was a CODA student.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special school (hearing disabilities)</td>
<td>• Of the 4 students, 3 were girls and 2 were boys.</td>
<td>• Of the 4 students, 1 had no disability (CODA) and the others were deaf.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Annex 3

Data collection, storage and management followed the UNICEF Procedure on Ethical Standards in Research, Evaluation, Data Collection and Analysis. The research instruments and fieldwork protocols were reviewed and approved by the Health Media Lab and the Institutional Review Board of the Office for Human Research Protections in the United States Department of Health and Human Services Research.

Annex 4

Figure 6: Data collection map and consent forms
Annex 5

Table 5: Prototypes used in the schools per visit

<table>
<thead>
<tr>
<th>Inclusive school</th>
<th>Special school (visual disabilities)</th>
<th>Special school (intellectual disabilities)</th>
<th>Special school (hearing disabilities)</th>
<th>Special school (hearing disabilities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit 1</td>
<td>Visit 1</td>
<td>Visit 1</td>
<td>Visit 1</td>
<td>Visit 1</td>
</tr>
<tr>
<td>Harriet Hen and the Hawk</td>
<td>My Brain is My Boss</td>
<td>My Brain is My Boss</td>
<td>Harriet Hen and the Hawk</td>
<td>My Brain is My Boss</td>
</tr>
<tr>
<td>Visit 2</td>
<td>Visit 2</td>
<td>Visit 2</td>
<td>Visit 2</td>
<td>Visit 2</td>
</tr>
<tr>
<td>Harriet Hen and the Hawk</td>
<td>My Brain is My Boss</td>
<td>My Brain is My Boss</td>
<td>Harriet Hen and the Hawk</td>
<td>My Brain is My Boss</td>
</tr>
</tbody>
</table>

Table 6: Ownership of devices used in the schools per visit

<table>
<thead>
<tr>
<th>Inclusive school</th>
<th>Special school (visual disabilities)</th>
<th>Special school (intellectual disabilities)</th>
<th>Special school (hearing disabilities)</th>
<th>Special school (hearing disabilities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit 1</td>
<td>Visit 1</td>
<td>Visit 1</td>
<td>Visit 1</td>
<td>Visit 1</td>
</tr>
<tr>
<td>Student-owned</td>
<td>Student-owned</td>
<td>School-owned</td>
<td>Both (50%/50%)</td>
<td>Both (50%/50%)</td>
</tr>
<tr>
<td>Visit 2</td>
<td>Visit 2</td>
<td>Visit 2</td>
<td>Visit 2</td>
<td>Visit 2</td>
</tr>
<tr>
<td>Both – mainly the school</td>
<td>Student-owned</td>
<td>School-owned</td>
<td>Both (50%/50%)</td>
<td>Student-owned</td>
</tr>
</tbody>
</table>

Student-owned | School-owned | Both (50%/50%) | Both – mainly the school | Student-owned | Student-owned | School-owned
References


Accessible Digital Textbooks: Creating Digital Tools to Enable Inclusive Education in Jamaica 29


