

WORKING PAPER

Using Digital Tools to Enable Inclusive Education in Bhutan

Lessons from the Accessible Digital Textbooks Pilot

Stefania Vindrola, Marta Carnelli, Thinley
September 2026

Executive summary

Across South Asia, more than 64 million children have a disability, representing approximately 11 per cent of all children aged 0–17 years. Children with disabilities globally continue to face substantial barriers to accessing quality learning opportunities. In Bhutan, 1,326 children with disabilities were enrolled in school as of 2024, out of a total of 156,272 students in general education (from pre-primary to secondary level) – representing less than 1 per cent of the total student population. Notable gender disparities persist in access to education: 63 per cent of enrolled children with disabilities are boys.

As part of its broader path toward a more inclusive education system, Bhutan’s Ministry of Education and Skills Development (MoESD) joined UNICEF’s Accessible Digital Textbooks initiative in 2024. Accessible Digital Textbooks (ADTs) are digitally converted versions of existing curriculum textbooks or storybooks, enriched with a range of accessibility features, such as audio narration (text-to-speech), sign language videos, Easy Read, glossary and image descriptions, designed to make learning content accessible to all students. The design of ADTs follows Universal Design for Learning (UDL) principles and can be used on a variety of devices, including tablets, computers and interactive smartboards, enabling both individual learning and whole-class teaching. The ADT initiative supports ministries of education in developing, piloting and scaling of these accessible digital learning tools.

This research report presents findings from the ADT pilot in Bhutan, conducted in 19 schools across nine districts between June and December 2025. This implementation research study documents how students with and without disabilities engaged with the ADTs, how teachers integrated them into their classroom practice, and the enabling factors and challenges that shaped implementation. The report concludes with a set of practical recommendations for policymakers, teachers and technology developers to strengthen future scale-up efforts, enhance teacher capacity, improve accessibility and inclusion, and ensure the sustainable integration of ADTs within Bhutan’s education system.

Overall, the research showed that ADTs can be an effective tool for fostering inclusive learning environments, though teachers noted that they were more helpful for students with ‘mild’ and ‘moderate’ disabilities. Most learners were able to log in and navigate the ADTs with minimal assistance. When using the ADTs for learning, most students engaged actively and enthusiastically with the content, using the accessibility features according to their needs. Many students with reading difficulties used the audio narration (text-to-speech) feature, while students with hearing disabilities relied on sign language videos. However, students with autism, Down syndrome, and multiple disabilities needed more guided support, as they often struggled to follow the teacher’s instructions or remain focused for extended periods.

The implementation also revealed challenges related to school infrastructure, software installation, usability of ADT accessibility features, and students' readiness to use technology. Limited access to information and communication technology (ICT) labs often prevented teachers from delivering lessons using the ADT consistently. Teachers also had to ensure that the software required to run the ADTs was properly installed, which added to their lesson preparation time. Many students needed additional time and practice to become familiar with the devices and with using the ADT accessibility features effectively. Some of these features – such as sign language videos and audio narration (text-to-speech) – also presented functional issues that limited how certain learners could benefit from the ADTs.

The recommendations that follow draw on these findings to guide improvements in teacher preparation, school-level implementation, and future development of ADTs in Bhutan.

Recommendations:



1. For teachers using ADTs and other digital technologies:

- Introduce ADTs gradually, using guided demonstrations and peer support to help students – especially those with disabilities – become familiar with the tools.
- Engage parents so ADTs can also be used at home, offering simple guidance on installation and use.



2. For the MoESD to adjust teacher training and professional development:

- Provide ongoing pre-service and in-service training on inclusive pedagogy, UDL, integration of ADTs into lesson planning, and effective strategies to use technology with diverse learners.
- Increase hands-on practice in ADT training, including collaborative lesson planning and opportunities to apply new skills.
- Monitor teachers' digital skills and ADT usage through routine school- or district-level assessments, to identify areas for additional training and support.



3. For the MoESD to strengthen the digital education ecosystem:

- Improve ICT device management in schools by establishing maintenance plans, allocating ICT staff, and budgeting for recurring costs.
- Support head teachers to integrate accessible digital materials into school-wide planning and ensure effective use of ICT infrastructure.
- Embed the production of accessible learning materials into national policies and budgets to scale inclusive education efforts.



4. For technology developers to improve the user experience of ADTs and other digital tools:

- Align sign language videos precisely with text and display both side by side.
- Add adjustable audio-speed controls for learners who need slower narration.
- Strengthen the Dzongkha version of ADTs to reflect linguistic characteristics.

As the ADT initiative expands in Bhutan, continued monitoring will be essential for improving the tool and assessing its effects on inclusion and learning outcomes. This involves leveraging accessible data collection instruments tested during this pilot to measure the impact of the programme as it reaches more districts and schools. Embedding research within programme implementation will support decision makers in adapting the programme across the context of Bhutan.

Contents

Executive summary	2
Contents	5
Introduction	6
Context	6
The Accessible Digital Textbooks (ADT) initiative	9
Developing accessible digital textbooks in Bhutan.....	11
Methodology.....	14
Analytical approach.....	14
Sample.....	15
Findings	16
Before ADT implementation	16
Were schools equipped to support students with disabilities?	16
What devices and connectivity are available for using digital content?	18
Are teachers prepared to use the ADTs in classroom settings?	19
In-classroom ADT implementation	22
How do students with and without disabilities interact and engage with the ADTs?	22
How do teachers use the ADTs in their teaching practice to engage students with different learning needs?	25
What positive experiences did students and teachers have when using ADTs in the classroom?	29
What are the challenges experienced by students and teachers when using the ADTs in the classroom?	31
Recommendations	36
Annexes	41
Annex 1: Participating schools	41
Annex 2: Data collection tools mapping in Bhutan	42
Abbreviations.....	43
References.....	44
Acknowledgements	45

Introduction

Context

Across the South Asia region, it is estimated that more than 64 million children – representing approximately 11 per cent of all children aged 0–17 years – have a disability.¹ This makes South Asia the region with the largest population of children with disabilities globally. Although school attendance rates have improved over the past decade, children with disabilities continue to face substantial barriers to accessing quality education, limiting their full participation and learning outcomes.²

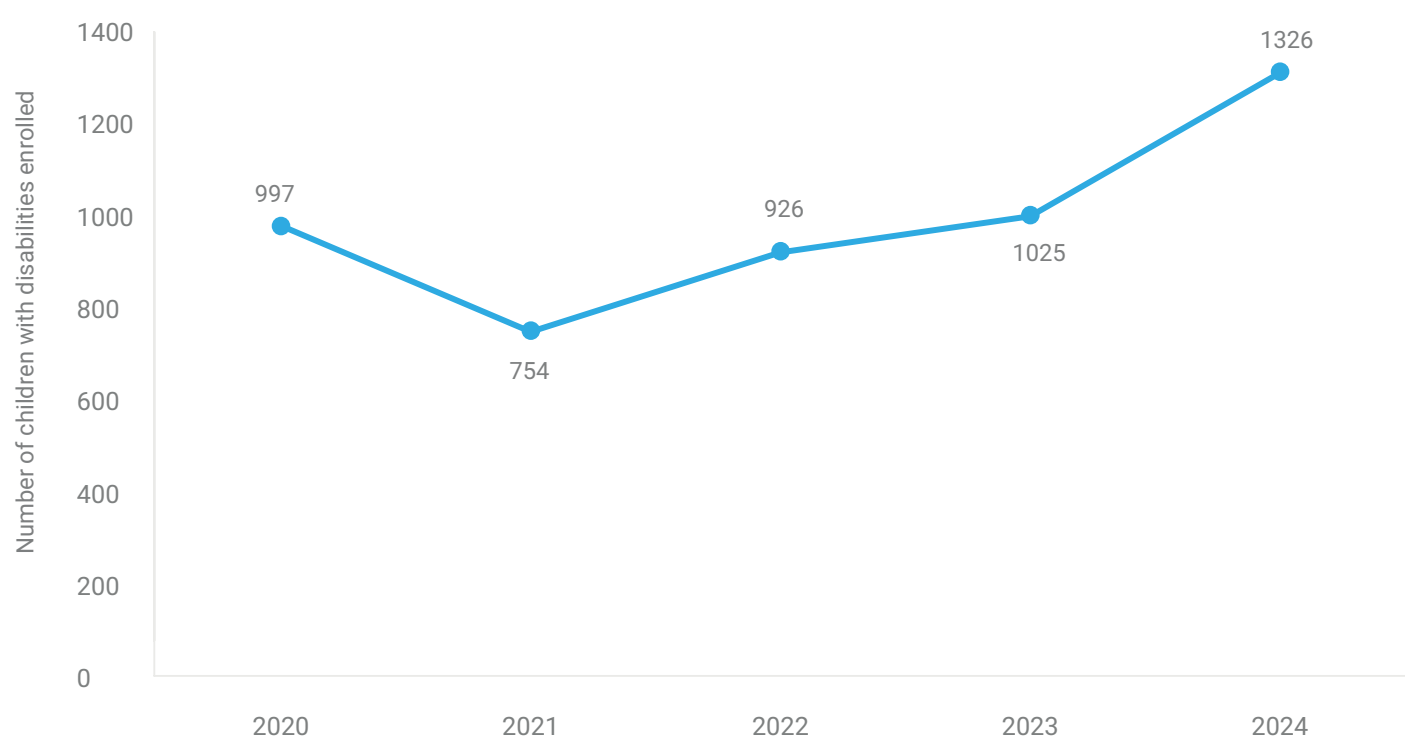
Although all countries in South Asia formally recognize the right of children with disabilities to education, this commitment is often not fulfilled in practice. Legislation and policy frameworks in the region continue to allow segregated educational settings, and efforts to include children with disabilities in mainstream classrooms frequently occur without adequate support systems to ensure accessible and effective teaching and learning.³

Bhutan is a small country located in the eastern Himalayas, with a population of less than 1 million people spread across 20 districts (Dzongkhags). The country is predominantly mountainous, with deep valleys, and scattered settlements that make connectivity and education service delivery a significant challenge.⁴ Dzongkha is the national language, though English is the medium of instruction in schools from an early stage. Bhutan's terrain and dispersed settlements make it hard and expensive to reach all children with many students, particularly in rural and remote areas, walking long distances to reach schools.⁵ For children with disabilities, these geographical challenges are compounded further, increasing the risk of being left out of education.

According to the 2023 National Health Survey, 48,325 persons aged 5 and above in Bhutan have a disability, representing 6.8 per cent of the total population. The most prevalent impairments are in self-care (2.4 per cent), hearing (2 per cent), and mobility (2 per cent). Geographically, disability prevalence is higher in rural areas (9 per cent) than in urban areas (4 per cent), with Wangdue Phodrang, Samtse, and Sarpang among the districts with the highest prevalence rates. No significant gender differences in prevalence were found across the country.⁶

As of 2024, 1,326 children with disabilities were enrolled in Bhutanese schools, out of a total of 156,272 students enrolled in general education (from pre-primary to secondary level), representing less than 1 per cent of the total student population. Annual Education Census data revealed notable gender disparities in access: 63 per cent of enrolled children with disabilities are boys, suggesting that girls face compounded barriers to accessing education.⁷ While overall enrolment of children with disabilities remains low, it has increased over the past five years (see Figure 1).

Figure 1. Number of children with disabilities enrolled in school, 2020–2024



Source: Annual Education Statistics reports 2020–2024, Ministry of Education and Skills Development, Government of Bhutan

To support the inclusion of children with disabilities in schools, the Government of Bhutan adopted the National Policy on Special Education Needs (SEN Policy) in 2012, marking an important shift toward a more inclusive approach to education. The policy promotes the inclusion or integration of children with ‘mild’ to ‘moderate’ disabilities into mainstream settings by providing support services, accessible infrastructure, adapted teaching and learning materials, and trained teachers.⁸

The MoESD has also developed the *Ten-Year Roadmap for Inclusive and Special Education in Bhutan 2018–2028*, a comprehensive strategy to improve access, strengthen quality and implement system reforms to support learners with disabilities.⁹ The roadmap focuses on raising awareness for early screening and intervention, improving school accessibility, promoting the establishment of special educational needs (SEN) programmes in mainstream schools, opening

specialized institutes for visual and hearing disabilities, building teacher capacity, developing accessible materials, and strengthening data systems to better capture information on children with disabilities.¹⁰ The number of mainstream schools offering the SEN programme has nearly doubled – from 24 in 2020 to 42 in 2024 – out of a total of 540 government mainstream schools. Two government-run specialized institutes have also been in operation since 2020 for children with visual and hearing disabilities.^{11,12} However, data gaps remain: while a SEN module has been integrated into the Education Management Information System, reported data captures enrolment disaggregated only by gender, geographical location and school type, but not by disability type.¹³

Bhutan has also made notable progress in improving the accessibility of its curriculum and teaching and learning materials. In 2017, the MoESD strengthened its commitment to inclusive education through the *Standards for Inclusive Education*, which incorporate principles of UDL and require that teaching and learning materials be adapted as necessary for students with physical, sensory, intellectual, social or language-related barriers.¹⁴ To equip teachers with the skills needed to implement these standards, modules on inclusive education have been integrated into pre-service teacher training programmes. The MoESD has also provided continuous professional development in inclusive pedagogies, although these have been limited to teachers in schools with enrolled students with disabilities. In 2022, the MoESD, in collaboration with UNICEF, also began the standardization and documentation of Bhutan's first official sign language, marking a significant milestone in ensuring accessible communication for learners with hearing disabilities.¹⁵

All these efforts reflect the continued dedication of the Government of Bhutan to enabling all learners to participate fully in their education. Building on this commitment, Bhutan joined the [ADT](#) initiative in 2024 to advance the development of digital tools that support inclusive learning for all children.



The Accessible Digital Textbooks (ADT) initiative

The ADT initiative is a collaboration between UNICEF, ministries of education, organizations for people with disabilities, publishers and technology partners. Launched globally in 2014, the initiative supports ministries of education with the tools and framework to convert their curriculum into inclusive digital learning tools known as ADTs to facilitate learning for children with and without disabilities in the same classroom. Through various consultations and workshops led by UNICEF, [guidelines](#) were developed to support ministries of education, publishers, and content and technology developers, as well as teachers and implementers, in digitally adapting curriculum-based textbooks using [UDL](#) principles. The goal of the ADT initiative is to improve access to quality, inclusive learning by enabling the production and use of accessible digital textbooks, supported by common guidelines, standards and tools, so all learners, including children with disabilities, can learn from the same curriculum content in the classroom.

In each country, the ADT initiative follows a clear methodology to design and develop ADTs that fit the context, while creating an ecosystem for their successful production, quality assurance, implementation and sustainability in schools. Research led by UNICEF Office of Strategy and Evidence – Innocenti is embedded in each stage to generate evidence and inform improvements in the initiative over time (*see Figure 2*).

Figure 2. Accessible digital textbook (ADT) implementation and research stages



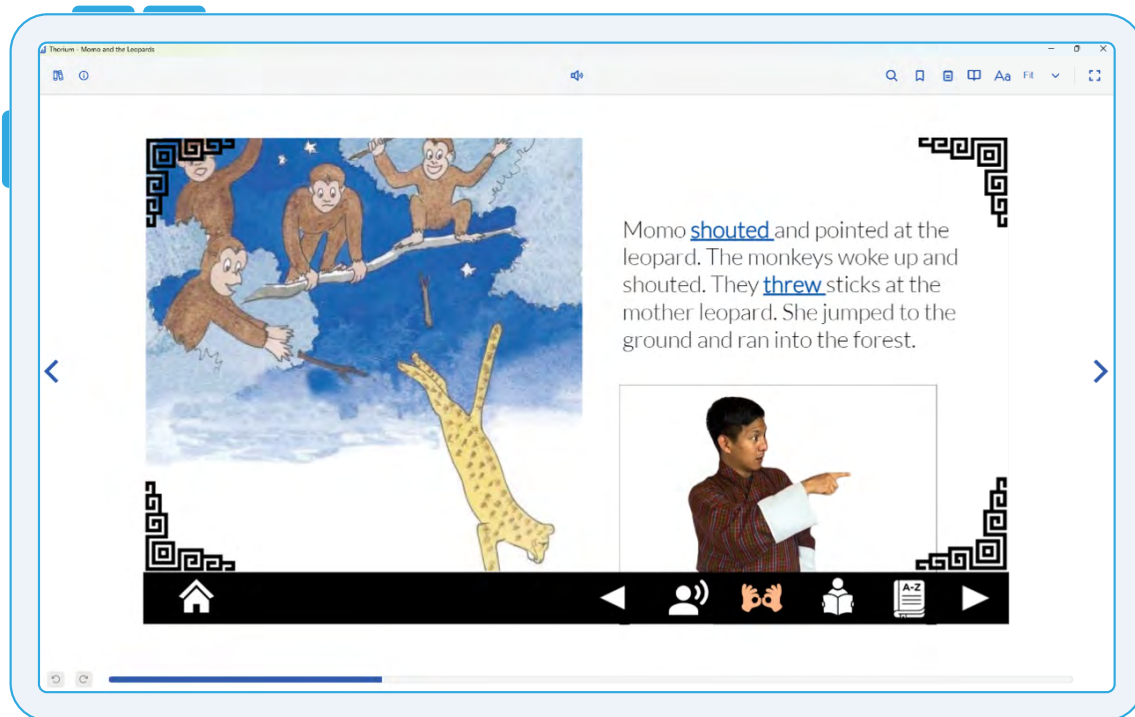
Developing accessible digital textbooks in Bhutan

After joining the ADT initiative in 2024, Bhutan established its ADT Technical Committee, which received UNICEF Bhutan's guidance and support. The committee includes representatives from the Centre for School Curriculum Development, and the Early Childhood Care and Development and SEN Division, within the Department of School Education at the MoESD. Among its functions, the committee selected the content to be adapted to an accessible format, and developed a workplan for the ADT production, validation, user testing and pilot stages between 2024 and 2025, focusing on primary-level education.

Four ADT storybook prototypes were developed for grades 1–3: *Momo and the Leopards* (grade 1), *The Yaks* (grade 2), *Ap Yangku Tashi* (grade 2), and *The Punakha Domchoe* (grade 3) (see Figure 3). The prototypes were developed by MoESD officials and teachers from inclusive schools and special institutes from different districts, during two workshops conducted in September and October 2024. One English storybook was selected per grade. For grade two, a Dzongkha storybook (*Ap Yangku Tashi*) was added to test the process for developing ADTs in the national language. All ADT prototypes included a range of accessibility features such as:

- **Audio narration (text to speech):** Reads the text aloud, enabling students with visual disabilities, reading difficulties, or low literacy levels to access the curriculum content without relying solely on written text.
- **Easy Read:** Simplifies language and pairs text with images, making content more accessible for students with intellectual disabilities, learning difficulties, and those in process of developing reading skills.
- **Sign language videos:** Delivers content in sign language, ensuring students with hearing disabilities can engage with the curriculum content in their primary language.
- **Glossary:** Provides clear definitions of key terms, supporting all learners – particularly those with intellectual disabilities and learning difficulties – to understand new vocabulary.
- **Image descriptions:** Describes visual content in text or audio format, ensuring students with visual disabilities can fully access illustrations, figures, diagrams and images in a book.

Figure 3. Images of the accessible digital textbooks



Momo and the Leopards – English version



Ap Yangku Tashi – Dzongkha version

User testing to validate the ADT prototypes was conducted in November 2024 in two special institutes serving students with visual and hearing disabilities. A total of 47 students and 10 teachers – from pre-primary to grade 6 – participated in classroom observations and focus group discussions aimed at assessing how they were able to navigate and how they interacted with the ADTs accessibility features. Based on the feedback from the ADT user testing, the following improvements were made:

- Audio narration was added to the Easy Read feature and activity instructions.
- Navigation buttons were simplified and standardized across all ADTs to ensure a consistent experience for learners.
- Sign language videos were integrated throughout all pages and activities.
- Sentence structure and vocabulary in the Easy Read feature were simplified to better align with the comprehension levels of younger and more diverse learners.
- Synchronization between text, images and videos was optimized to create a more seamless learning experience.
- File sizes of ADTs were reduced to address storage limitations on devices.

Following the user testing stage, 36 teachers from 19 schools (13 inclusive schools, 4 general schools and 2 special institutes) across 9 districts were selected to be trained for the pilot stage. The training, held in May 2025, covered the importance of ADTs for children with and without disabilities, how to identify and use their accessibility features, how to develop strategies to integrate ADTs into lesson planning, and how to build the digital skills needed to access and navigate ADTs on various platforms.

The pilot was conducted in the 19 trained schools between June and December 2025 (*see Annex 1*). This stage aimed to further assess the usability and suitability of the storybooks in ADT format, test the use of ADTs within classrooms and document inclusive classroom practices to engage students with different learning needs.

Led by UNICEF Innocenti, this research is part of a global and regional effort coordinated by UNICEF Global Learning Innovation Hub and UNICEF Regional Office of South Asia (ROSA) working across Bhutan, Nepal and Sri Lanka. Bhutan pioneered ADT prototype testing in the region, involving 36 teachers across 19 schools. This pilot stage report documents the experiences of students and teachers using ADTs, focusing on gaining further understanding of the school context for ADT implementation, inclusive pedagogies used in the classroom, positive experiences and challenges encountered by teachers and students. It also aims to provide recommendations to inform ongoing progress as the ADT initiative evolves and scales up nationally.

Methodology

The ADT pilot focused on testing how the ADTs were utilized in classrooms of grades 1–3 having students with and without disabilities.

This stage included the following research questions:

- Are schools equipped to support children with disabilities?
- What devices and connectivity are available for using digital content?
- Are teachers prepared to use the ADTs in classroom settings?
- How do students with and without disabilities interact and engage with the ADTs?
- How do teachers use the ADTs in their teaching practice to engage students with different learning needs?
- What positive experiences did students and teacher have when using ADTs in the classroom?
- What are the challenges experienced by students and teachers when using the ADTs in the classroom?

Analytical approach

To address the research questions, mixed methods research was embedded within the pilot to gather information on the use of ADTs and inclusive practices in classrooms. The research combined and triangulated various different data sources from students, and teachers. These included school assessment forms, classroom observations, focus group discussions (FGDs) with teachers, and teacher journals to identify best practices and challenges in utilizing ADTs.

Data collection instruments were co-developed, adapted and validated by UNICEF Bhutan, UNICEF ROSA, UNICEF Innocenti, and the MoESD. The research protocol and instruments received ethical approval from an external Institutional Review Board. The instruments applied included the following (*see Annex 2*):

- **Pre- and post-teacher training surveys** were administered to 36 teachers to assess their familiarity with technology before the ADT implementation, experience with inclusive pedagogy – including UDL – and perceptions of technology-enhanced education, as well as to gather feedback on the ADT training received.
- **School assessment forms** were completed in 19 schools to document the environment in which the ADTs would be implemented, and assess comparability across schools in terms of infrastructure, accessible materials, human resources, digital devices and internet connectivity, among others.

- **Classroom observations** were conducted with 18 teachers – 3 from grade 1, 11 from grade 2, and 4 from grade 3 – to gain insights into classroom dynamics and the use of ADTs by teachers and students. These observations focused on student-teacher interactions, documented the time teachers dedicated to using ADTs during lessons, assessed the quality of teaching practices from an inclusive perspective, and identified both promising practices and challenges related to ADT implementation. Teachers were observed only once, often in the initial sessions of ADT implementation.
- **FGDs** were conducted with 15 teachers from 13 schools following classroom observations, with one held in each of the districts of Haa, Paro, Punakha, and Thimphu Thromde. Each FGD brought together teachers from different schools within the same district, to explore their training, the methods for using the ADTs in class, challenges faced, their feedback for ADT improvement, and their overall experience of the implementation process.
- **Teacher journals** were kept by teachers each time they used ADTs in class, providing routine documentation on modes of usage, student reactions, challenges encountered, and overall feedback. A total of 91 journal entries were collected from 31 teachers.

Data collection took place between June and December 2025. Pre- and post-training teacher surveys, school assessment forms and teacher journals were completed digitally by participants using Kobo Toolbox. Classroom observations and FGDs with teachers were conducted and digitized by researchers from UNICEF Bhutan and the MoESD. Both quantitative and qualitative data were triangulated across multiple sources to validate the findings and ensure that lessons learned reflected diverse perspectives.

Sample

Nineteen schools in nine districts were selected by the MoESD and UNICEF Bhutan, based on their existing infrastructure and the availability of devices needed for students to use the ADTs. Of these, 13 were inclusive schools serving students with and without disabilities, 2 were special institutes serving only students with disabilities, and 4 were general schools serving only students without disabilities (*see Annex 1*). The sample was intentionally selected to ensure representation of different school types, as well as a diversity of disabilities and students without disabilities. In most inclusive schools, students with and without disabilities attended the same classrooms, though in two schools students with disabilities learned in separate environments. The average class size across participating schools was 26 students, of whom 12 were girls, and autism was the most common disability reported among students.

Findings

Before ADT implementation

This section presents findings on the key elements necessary in preparation of ADT implementation, focusing on inclusion policies, school and classroom infrastructure, devices and connectivity for the use of digital content, accessibility of teaching and learning materials, and teacher training.

Were schools equipped to support students with disabilities?

Identification of students who need additional support

Most surveyed schools serving students with disabilities have established procedures to identify learners who need additional support. Overall, 93 per cent (14/15 schools with students with disabilities) report having a written protocol in place. Teachers explain that these procedures are typically developed at the school level but draw guidance from Bhutan's SEN Policy. Identification is primarily carried out by classroom teachers, who rely on observation and assessment tools to determine which students may require additional support. Once identified, students are referred to the school SEN coordinator – when available – or to an external specialist.

A large majority of schools (80 per cent, 12/15 schools with students with disabilities) also have established procedures to determine the specific types of support students may need. Teachers report that these qualification procedures are likewise guided by the national SEN Policy, with support tailored to the nature and severity of each student's individual needs.

Availability of accessible materials and assistive technology

Most schools serving students with disabilities (60 per cent, 9/15 schools with students with disabilities) reported a lack of educational materials available in accessible formats. Among the schools that do provide such materials, the most commonly used formats include sign language videos and audiobooks. While these resources are generally available across different education levels, several teachers note that they are often limited to classrooms where children with disabilities are taught separately, or are found primarily in special schools. These findings point to the need to move beyond isolated provision. Establishing a systematic pipeline for the production, distribution and regular updating of accessible teaching and learning materials – embedded in national education policies and budget arrangements – is essential so that all students, regardless of school or disability type, have equitable access to the resources they need.



In the absence of accessible educational materials, teachers employed a wide range of pedagogical strategies to support learners with disabilities, some of which result in segregated learning. In FGDs, some teachers mentioned that they rely on digital devices and formats such as televisions, smart boards and online videos, while others adapt existing materials designed for students without disabilities or use differentiated instruction techniques. In some cases, teachers mentioned that students with disabilities are removed from their regular classrooms for certain subjects to receive individual instruction in separate spaces, where adapted materials may be available. The use of separate groups within the same school was widespread in schools involved in the pilot: in almost all inclusive schools surveyed (85 per cent, 11/13 schools), teachers reported that students with disabilities learn both in the same classroom as their peers without disabilities and in separate classrooms. Main teachers in regular classrooms decide when to place students in separate groups based on their observation that the child is unable to follow the lesson alongside peers without disabilities and requires one-on-one support with adapted materials. In separate classrooms, students are taught by special education teachers who design specialized lessons according to their needs. While these practices reflect teachers' efforts to respond to diverse needs, they also highlight an education system in transition – where inclusive and segregated approaches coexist. This points to both a genuine commitment to inclusion and to persistent gaps in materials, teacher training and support that make full inclusion difficult to sustain.

Access to assistive technologies remains scarce across surveyed schools. A majority of schools serving students with disabilities (60 per cent, 9/15 schools with students with disabilities) reported not having any assistive devices. Among the few that do, the most commonly available items include a tablet stand – found in only 2 of 15 schools – and a button type switch device, available in just 1 of 15 schools. Three schools also reported having computers that are used as assistive technology.

What devices and connectivity are available for using digital content?

Most schools have functional ICT infrastructure that can support the use of digital learning materials, including ADTs, by students with and without disabilities. A large majority of schools (84 per cent, 16/19 schools) reported having at least one operational ICT lab equipped with working computers where ADTs can be accessed. These spaces are commonly used during scheduled ICT periods or during free periods such as breaktime, lunchtime or unscheduled class time.

Beyond the ICT labs, most schools (79 per cent, 15/19 schools) have digital devices available for use directly in classrooms. On average, schools reported having around four computers and eight tablets outside the ICT lab, accessible to students with and without disabilities. However, this supply falls short of current demand as schools reported having 10 students with disabilities on average in grades 1 to 3. In almost all schools visited (89 per cent, 17/19 schools), ADT lessons were conducted in the ICT lab, where students worked individually on their own device or in small groups. Among schools that have devices outside the ICT lab, most (80 per cent, 12/15 schools with students with disabilities) have designated staff responsible for managing devices and accessories, and more than half (67 per cent, 10/15 schools with students with disabilities) have charging stations that allow for consistent use of these devices throughout the day.

Almost half of the teachers report that school connectivity often falls short of what digital learning requires. Sixteen per cent (3/19 teachers) describe their school's internet bandwidth as poor, noting frequent service interruptions, and 32 per cent (6/19 teachers) consider it average, sufficient mainly for downloading and sending documents. Teachers also mention that internet availability varies across school facilities. Nearly half of schools (47 per cent, 9/19 schools) have connectivity throughout the entire campus, while an equal proportion have access limited to administrative areas. Additionally, 37 per cent (7/19 schools) also have connectivity available in ICT labs or similar learning spaces. Creating a reliable enabling environment for ADT use will therefore require not only improving connectivity infrastructure over time, but prioritizing offline functionality as a core feature of ADT design, ensuring that digital learning tools remain accessible even in low-connectivity settings.

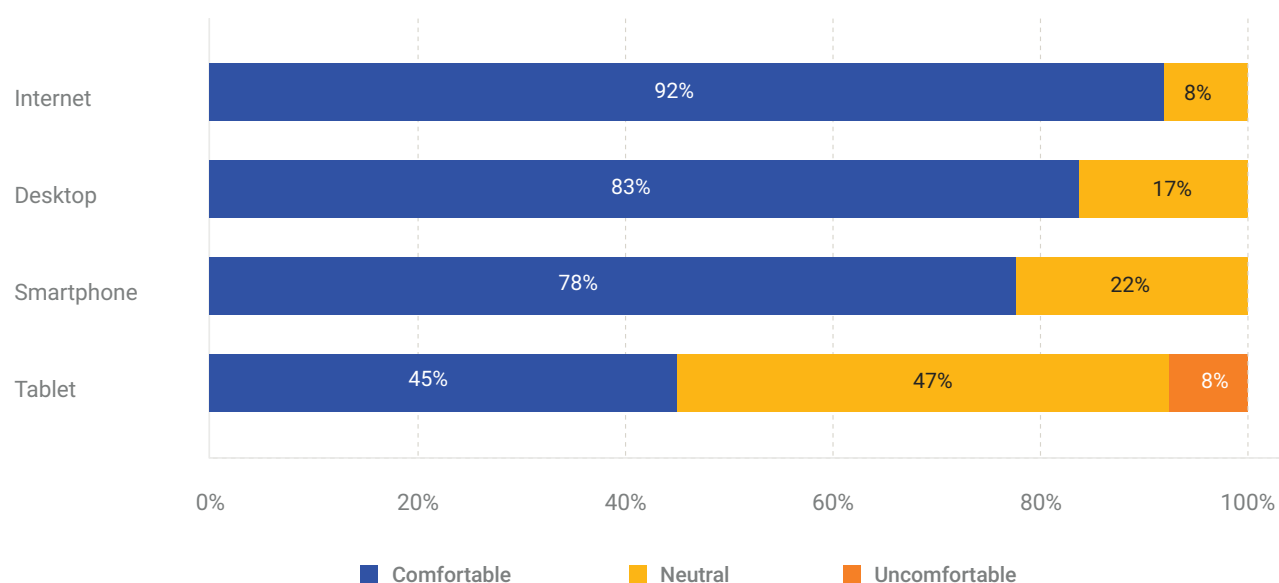
Are teachers prepared to use the ADTs in classroom settings?

Familiarity with technology

Teachers generally felt confident using digital devices, though comfort varied by device.

Most teachers reported feeling comfortable using smartphones, computers and the internet for instructional purposes (see Figure 4). However, levels of comfort with tablets were more mixed, with a notable share of teachers (55 per cent, 20/36 teachers) indicating neutral or uncomfortable responses.

Figure 4. Teachers' comfort use level by device

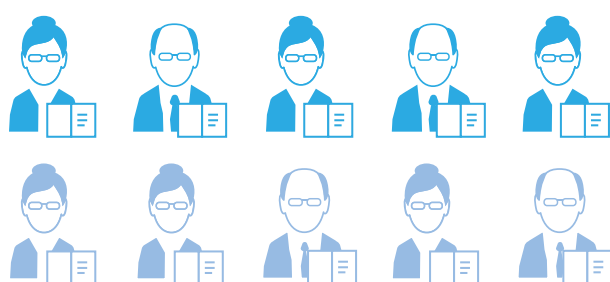


Despite having limited formal training, teachers were already actively incorporating technology into their teaching.

Very few participants reported having received training on how to use digital tools to support student learning, yet almost all teachers (94 per cent, 34/36 teachers) had used technology to explain or demonstrate content in the past year. The most commonly used devices reported for digital learning and instruction include computers, projectors, televisions and smartphones – tools that are typically employed in teacher-led activities. This organic adoption of technology reflects both teachers' initiative and an unmet need for structured support: embedding digital skills training and inclusive technology use into both pre-service training and continuous professional development programmes would equip teachers with the knowledge and confidence to leverage technology, including ADTs, to actively support the participation and learning of all students.

Knowledge of inclusive education and UDL

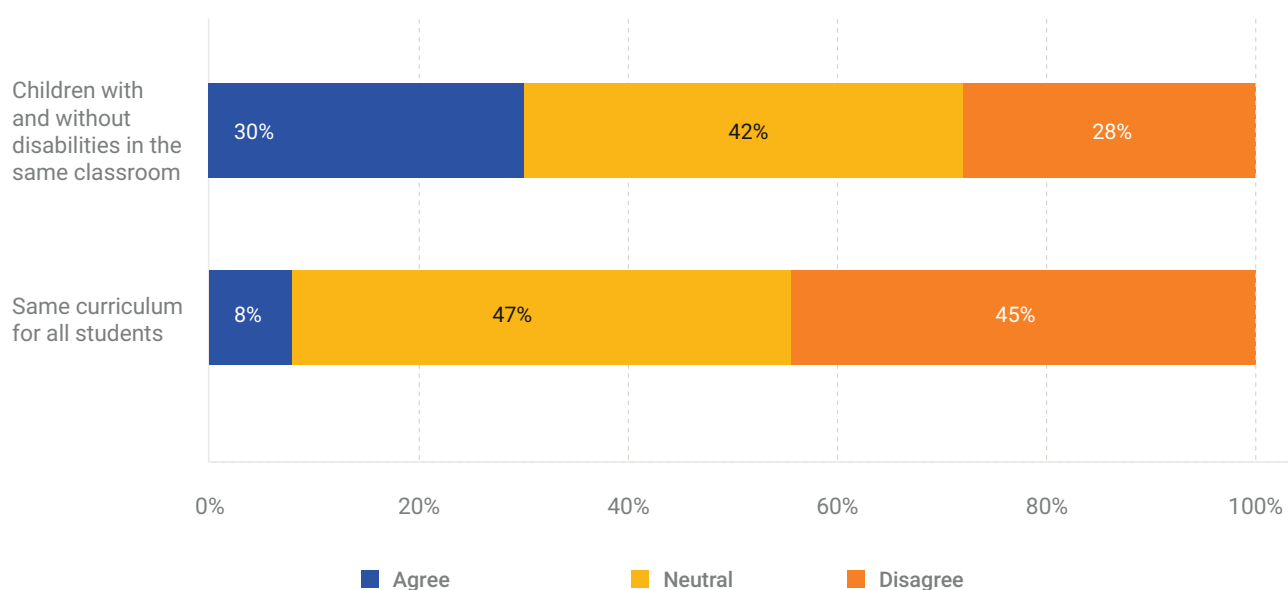
Teachers faced significant gaps in preparation for inclusive education, including limited knowledge of core pedagogical frameworks such as UDL. In the pre-training survey, half of the teachers (53 per cent, 19/36) reported having received at least one training in inclusive education, yet only 14 per cent (5/36) have been trained in the use of assistive technologies in the classroom. Also, less than half of teachers (42 per cent, 15/36) had prior knowledge of UDL. These gaps underscore the need to equip teachers with the key knowledge and skills to implement inclusive education, such as how to adapt instruction to diverse learning needs, apply UDL principles, and integrate ADTs into lesson planning, through both pre-service teacher training and continuous professional development programmes.



5 in 10
teachers have received
at least one training in
inclusive education

Teachers also expressed mixed – and sometimes contradictory – views on how inclusive education should be implemented. While many teachers express support for having students with and without disabilities learn together in the same classroom, almost all (92 per cent, 33/36 teachers) also disagree or remain neutral towards implementing the same curriculum for all students, including those with disabilities (*see Figure 5*). This suggests nuanced or possibly conflicting views on inclusive education in practice, prior to the ADT teacher training. These perspectives show some variation by years of teaching experience, with more novice teachers holding less inclusive views. However, given that the majority of surveyed teachers had less than 10 years of experience, this trend should be interpreted with caution.

Figure 5. Teachers' views on inclusive education



N=36 teachers

Source: Pre-teacher training survey

Training for ADT implementation

The ADT implementation training equipped teachers with a clear understanding of the value of ADTs for all learners, familiarized them with the available accessibility features, supported them in integrating ADTs into lesson planning, and strengthened their digital skills for navigating these tools across different platforms.

Teachers reported that, although the ADT training was helpful, they still lacked confidence in using the ADTs in practice. This suggests that, while the training was well received, several teachers would benefit from additional support and hands-on opportunities to strengthen their skills and feel fully prepared to use ADTs independently in their classrooms. Many teachers (75 per cent, 27/36) agreed that the five-day training duration was too short given the volume and depth of content to be covered. Some teachers (22 per cent, 8/36) also expressed the need for more time dedicated to interactive activities, particularly to further practice how to use the different ADT accessibility features and incorporate digital learning tools into their lesson planning. This finding is consistent across other countries, such as Dominican Republic, Jamaica, Lebanon, Mexico and Paraguay, who have introduced the use of ADTs or other digital learning tools in classrooms.^{16,17,18,19,20} These findings point to the need to revise ADT teacher training to prioritize hands-on practice, providing teachers with dedicated time to explore the accessibility features, collaboratively develop lesson plans integrating ADTs, and receive feedback on their approach, so that training translates into classroom readiness.

After attending the training, I was not very ready and confident to implement it, though the training was good and comprehensive. The two days of training didn't give me much hands-on practice. I could not catch up everything presented during the training. Once I was back in the school, I explored the ADT features and realized that I needed to understand the ADT better before using it with the students, so I asked other colleagues for support, and I gradually became more experienced and confident to use the ADT.

Teacher, inclusive school, Punakha

Despite these challenges, teachers were able to use all ADT accessibility features during the training. Most teachers (75 per cent, 27/36) found playing audio files easy to use, followed by playing sign language videos (53 per cent, 19/36) and accessing the glossary (50 per cent, 18/36), yet a few (5/36) reported difficulties with the activities feature. In the post-training survey, most teachers indicated that they would use the ADT as a regular teaching resource; however, some noted that the amount of content currently available in ADT format is insufficient to use it consistently. Teachers recommended developing ADTs for additional subjects and upper grades, including storybooks and textbooks, to maximize the tool's usefulness in daily classroom instruction.

In-classroom ADT implementation

Almost all observed ADT sessions were conducted in the ICT lab, where class sizes ranged from 18 to 29 students on average. Teachers reported they typically required less than five minutes to transition students from their classrooms to the ICT lab and begin the lesson. In almost all schools (89 per cent, 17/19 schools), ADTs were used individually during these ICT lab sessions, with each student working on their own device. On average, in addition to the teacher, another staff member was present during the sessions, usually serving as a co-teacher or providing ICT support.

This section explores the ways in which ADTs are incorporated into classroom routines, the teaching practices and accessibility features teachers use to promote inclusion, and the ways students engage with ADTs for learning.

How do students with and without disabilities interact and engage with the ADTs?

Logging in and navigating the ADTs

In more than half of observed sessions (56 per cent, 10/18), students were able to open the ADT without difficulties, autonomously and following the teacher's instructions. However, in 28 per cent of classrooms (5/18), students required support from the teacher or the ICT lab

assistant, most often when they struggled to locate the login buttons. These challenges were experienced primarily by learners with Down syndrome and autism, while some with hearing disabilities also required assistance.

Students without disabilities generally logged in with ease, requiring minimal support – typically only when they had forgotten their passwords. In the FGDs, teachers noted that many of these students were already familiar with the Thorium EPUB reader used to run the ADT, having worked with it in previous lessons. Few students encountered technical issues, but these were linked to older operating systems, such as Windows 7, which did not support the ADT and prevented them from opening it independently.

Navigation of the ADT was accessible for most students, with 56 per cent (10/18) of observed classrooms reporting that learners navigated the tool without difficulty after initial instructions. In another 28 per cent (5/18) of classrooms, students navigated spontaneously, quickly identifying the play, pause and stop buttons and moving between pages with ease. Students with Down syndrome required more sustained support from teachers or ICT assistants to stay focused and follow navigation steps, while students with autism often relied on teacher demonstrations to understand how to use the controls. Some students with hearing disabilities navigated more slowly at first but were able to learn the process with minimal guidance. These varied navigation experiences suggest that a gradual introduction to ADTs by teachers – through guided demonstrations, peer support and repeated practice across sessions – would help all learners, particularly those with disabilities, build confidence and independence in using the digital tool.



Using the ADTs for learning

Student engagement with the ADTs varied across disability types, with students with autism and Down syndrome experiencing the greatest challenges. Students with hearing disabilities were generally able to follow the story, relying primarily on the sign language videos to access and understand the content. In contrast, learners with autism and Down syndrome often struggled to follow teacher instructions, understand the story, and remain engaged, and therefore required continuous supervision from a teacher or ICT lab assistant. Students without disabilities engaged actively with the digital materials, following instructions, asking clarifying questions, consulting the glossary for word meanings, completing quizzes, and sharing their results with peers. The varied ways in which different disability types affect students' ability to engage with ADTs underscore the need for more formal teacher training that addresses disability-specific adaptations. Promoting dedicated spaces within schools and across the system for teachers to share effective strategies on how to engage different disabilities in the classroom is also essential to making ADT use accessible and meaningful for all learners.

Teachers believe that ADTs are more effective for students with 'mild' or 'moderate' disabilities, whom they consider better able to understand the content, maintain attention and meet behavioural expectations. They noted that students with what they classified as 'severe' disabilities often had associated behaviours that limited their ability to follow lessons or remain engaged for extended periods. In some cases, these behaviours also led to damage of devices, keyboards or mice through throwing or hitting.

I observed that the ADT is more applicable to general and functional classrooms where there are children with mild and moderate disabilities. Since these students do not have much behaviour issues, they are interested and are able to use the ADT. Using the ADT is challenging for students with severe disabilities where we require more teachers to handle and assist them.

Teacher, inclusive school, Paro

Teachers used the activities embedded in the ADT in less than half of the observed sessions (44 per cent, 8/18 classrooms). In classes where activities were used, students with disabilities were unable to complete them without additional support or at the same pace as their peers without disabilities. For example, only a few students with hearing disabilities in a special institute were able to explore the true or false questions independently, and students with autism and Down syndrome in some inclusive schools struggled to understand them. Students without disabilities generally faced fewer challenges, although some were observed randomly selecting answers in the true or false or filling the blank questions, often to finish quickly or know the correct responses. In sessions where ADT-embedded activities were not implemented, this was due to teachers allocating time to other tasks, using separate worksheets, or students taking

longer than anticipated to read the ADT content. Despite this, some students without disabilities were observed exploring the quizzes independently, even when these were not part of the lesson plan. These findings reinforce the need for teacher training to include disability-specific strategies for facilitating ADT-embedded activities, equipping teachers with practical tools to scaffold participation and adjust the pace and level of support provided to meet the diverse needs of all students.

Collaboration among students was common when using the ADT, with 94 per cent of observed classrooms (17/18) showing students working together while engaging with the tool. Some students without disabilities collaborated with their peers by looking at one another's screens, comparing content, and discussing what was displayed. Collaboration also extended to supporting students with disabilities, helping them locate navigation buttons and use the audio and speed regulation features. This evidence points to the potential of ADTs to foster not only individual learning but also meaningful peer interaction, creating natural opportunities for students with and without disabilities to learn alongside and from one another, which is at the heart of inclusive education.

How do teachers use the ADTs in their teaching practice to engage students with different learning needs?

Teaching practices when using the ADTs

In observed lessons, all teachers used the ADT as their primary teaching tool; half (50 per cent, 9/18) relied exclusively on it, while a third (33 per cent, 6/18) complemented it with the printed storybook. According to teacher journals, *Momo and the Leopards* was the most frequently used ADT (33 per cent), whereas *The Yaks* was the least used (16 per cent). By grade, *Momo and the Leopards* was more commonly used by teachers in grade 1, *Ap Yangku Tashi* and *The Yaks* in grade 2, and *The Punakha Domchoe* in grade 3. This pattern reflects curriculum-driven choices, as each book was developed for those specific grades. However, a few teachers used the ADTs with students one grade above or below the intended level.

When introducing the ADT to students, teachers' instructional approaches followed similar routines across classrooms, with limited adaptation for students with disabilities. Almost all teachers (89 per cent, 16/18) began lessons by informing students that the ADT would be used, and most (61 per cent, 11/18) linked the day's content to prior learning, often by asking questions to check students' recall. Some also connected story locations and characters to students' personal experiences. Differentiated instructional practices were minimal, aside from the use of sign language with students with hearing disabilities. Across classrooms, all teachers relied on oral explanations and signalling to demonstrate how to use the ADT to the whole class, and most (67 per cent, 12/18) conducted a guided tour of the interface, showing navigation buttons before

giving students time to explore independently. For students with hearing disabilities, teachers demonstrated how to access and enlarge the sign language videos. These findings suggest that while teachers have developed a consistent approach to introducing ADTs, differentiated instruction remains an area for growth; equipping teachers with a broader range of strategies for adapting the introduction and facilitation of ADT sessions to the diverse needs of their students would strengthen inclusive practice.

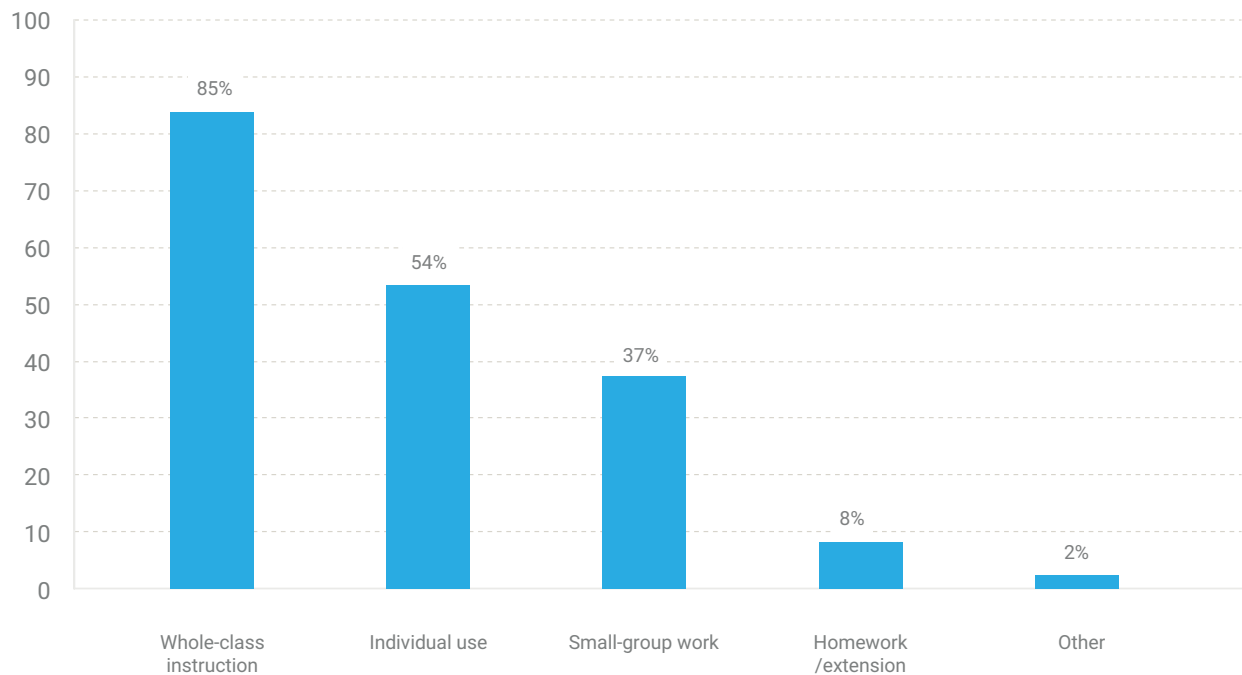
I used all the features of the ADT while orienting the children. I oriented them on how to use ADT features before really going into the main reading of the ADT text. While reading the ADT, I used to prompt and ask children the function of different ADT features. Children used these ADT features during the lessons, and they were able to identify and say the name of each feature.

Teacher, inclusive school, Thimphu Thromde

Teachers employed a set of pedagogical strategies when using the ADTs, with whole-class teaching dominating classroom practice. Teacher journals indicate that whole-class instruction was the most common approach (85 per cent), although individual use – where students accessed the ADT on a device assigned to each – was also frequent (54 per cent) (*see Figure 6*). The prevalence of whole-class instruction is related to device availability: 66 per cent of teachers who reported using whole-class instruction also noted that the number of functional devices in their school was insufficient for all students in the classroom to work individually. Whole-class instruction was more common when teachers explained the lesson objectives or demonstrated how to navigate the ADTs, while individual work was typically used when students engaged with the ADT content or completed the embedded activities. These pedagogical approaches were sometimes combined within the same lesson, most commonly pairing whole-class instruction with individual use of ADTs and small-group work (21 per cent), or only with individual use of ADTs (20 per cent).

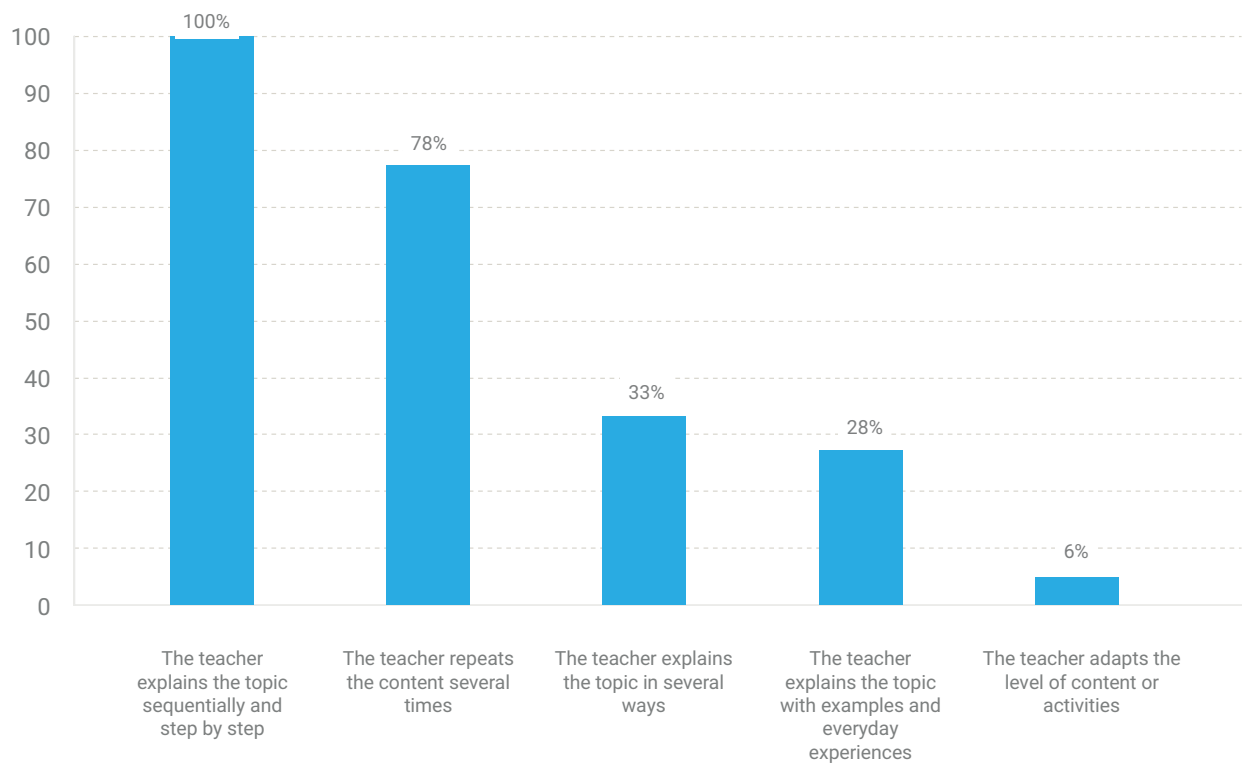
Regarding teaching practices to explain the lesson topic across classrooms, all teachers explained lesson content sequentially and step by step, and most (78 per cent, 14/18) repeated key points several times (*see Figure 7*). In FGDs, some teachers mentioned that they also used additional visual aids to support students with disabilities, including cut-out images of storybook characters or writing key vocabulary on the board, while sign language was used in special institutes to support students with hearing disabilities.

Figure 6. Teaching practices to integrate accessible digital textbooks (ADTs) into lessons



N=91 journal entries, by 31 teachers
Source: Teacher journals

Figure 7. Teaching practices to explain the lesson topic



N=18 teachers
Source: ADT classroom observations

Most teachers (78 per cent, 14/18) employed strategies to check students' understanding, though these approaches were directed at the whole class rather than tailored specifically to students with disabilities. Common practices included asking questions during or after ADT story sections and inviting students to share key learnings or checking how many students have completed the activities. A smaller group of teachers (4/18) also incorporated additional tasks beyond those included in the ADT to check for students' understanding, such as creating their own worksheets or asking students to draw characters or scenes from the storybooks. These findings reflect a foundation in formative assessment practice. Complementing existing whole-class approaches with more individualized strategies, particularly for students with disabilities, would further strengthen teachers' ability to identify and respond to diverse learning needs in real time.

Besides the interactive activities like fill in the blanks, I have seen teacher colleagues using other activities. For example, I have observed a teacher making students sketch the ADT characters on A4 paper and ask short-answer questions.

Teacher, inclusive school, Thimphu Thromde

Almost all teachers (94 per cent, 17/18) offered individual support based on their own observations of students' needs, and more than half (72 per cent, 13/18) also provided assistance when students explicitly requested it. For students with disabilities – especially those with autism – support was commonly delivered by a co-teacher or ICT lab assistant, who helped students remain focused and guided them through the story sequentially. For students without disabilities, teachers often paused throughout the story to offer real-life examples connected to the content, ask questions to check understanding, or invite students to read aloud. Teachers also moved around the classroom to identify students who needed additional help and provide targeted support as needed. These findings point to a teaching culture that is attentive and responsive to students' needs. The use of co-teachers and ICT assistants to support students with disabilities is an established practice in many schools in Bhutan. Strengthening their collaboration with main teachers through joint lesson planning, clear role definition, and shared reflection would help ensure that support for students with disabilities is coordinated, consistent and purposefully integrated into lesson planning.

Features of the ADTs used by teachers

Across observed classrooms, teachers made use of a wide range of ADT features with students. Almost all teachers (94 per cent, 17/18) used the audio narration (text-to-speech) and glossary functions, while nearly half (44 per cent, 8/18) incorporated the ADT activities into their lessons. A smaller proportion (28 per cent, 5/18) also used the sign language videos. The least frequently used features were the Easy Read option and the image description. In FGDs, teachers

discussed that learner needs drove which features they used more frequently. They noted that the audio narration (text-to-speech) feature was useful for all learners, whereas features such as the image description and sign language videos were only used when students with visual and hearing disabilities were present. The only feature consistently tailored for students with hearing disabilities was the sign language video. However, in an inclusive school in Punakha, students without disabilities also expressed interest in exploring the sign language videos, even though no students with hearing disabilities were present in their classroom. The teacher noted that these students were eager to watch the videos and try to understand the signs, showing how accessibility-oriented tools can stimulate curiosity and engage a broader group of learners.

Learners were excited to read the text aloud together from the screen and they were also able to read the unfamiliar words with the help from the audio. Children could also read and understand the meaning of the new words through the dictionary available in the text. They really enjoyed the quiz section as the activity helped them recollect the text they read, and [was] also a means to help them learn the text through such fun activity.

Teacher, inclusive school, Thimphu Thromde

Teachers also highlighted the usefulness of adjusting screen brightness, contrast, font size and image zoom within the ADTs, noting that these features improved visibility and clarity and enhanced comfort for all students.

What positive experiences did students and teachers have when using ADTs in the classroom?

Teachers reported that ADTs enhanced students' learning experience by making lessons more dynamic, interactive and responsive to students' diverse needs. Nearly half of teachers (47 per cent) considered student engagement to be high, while 52 per cent described it as moderate. Classroom observations evidenced these perceptions, showing that most students remained attentive and focused while using the ADT, exploring pages, using navigation buttons, and reading the stories. Teachers emphasized that ADTs offer a more stimulating learning experience than traditional print books, particularly for students who are immersed in a digital environment since their early years, where multimedia content, smartphones, tablets and visual media feel more engaging and familiar. In FGDs, teachers noted that the ADTs fostered curiosity and motivation, with students showing more enthusiasm for learning as they explored different features while reading the ADT storybooks and completing the activities. Together, these findings point to ADTs as an opportunity to make learning more engaging, relevant and responsive for all students.



During the lessons on The Punakha Domchoe using the ADT, several positive improvements and notable student behaviours were observed. Students were very excited and motivated to read the text using the ADT. Many said they enjoyed the lesson more because they could read independently and control their pace. Students were able to read the text without teacher assistance, which increased their confidence. They especially liked being able to pause the audio, replay sections and revisit difficult parts on their own.

Teacher, inclusive school, Punakha

Teachers highlighted that the ADTs promoted students' autonomy in learning. They observed that some students with disabilities could independently choose how to use accessibility features to tailor the learning experience to their needs, reducing reliance on teacher support for reading or understanding vocabulary. Teachers also mentioned that this ability to self-adjust features contributed to a greater sense of independence and confidence among students.

Using the ADT in class made my work as a teacher easier. Before using the ADT, I had to read to the class from the text first, followed by the students. We needed to frequently refer to the dictionary for word meanings. This takes more time. Now, with the ADT, it really made our work easier. It is fun and enjoyable. Using ADT is more student-centred learning.

Teacher, general school, Paro

Teachers reported that the ADTs had a meaningful impact on students' learning, enhancing comprehension and engagement for students with diverse learning needs. In FGDs, teachers mentioned that they had noticed gains in children's reading skills, intonation,

pronunciation and vocabulary. They highlighted strong benefits for students with learning difficulties, especially through the audio narration (text-to-speech) feature. For example, a teacher in an inclusive school in Punakha noted that this feature reduced the pressure on students with dyslexia to read independently, and that listening to the text while reading it simultaneously, supported understanding and retention by engaging multiple senses. Another teacher from an inclusive school in Thimphu Thromde mentioned that a student with an intellectual disability improved his Dzongkha vocabulary through repeated use of the ADT. The glossary feature was also described by teachers as useful for reinforcing reading comprehension. While these remain teacher-reported perceptions rather than direct measures of student learning outcomes, their consistency across schools is encouraging and points to the potential of ADTs as an inclusive learning tool. Measuring their impact more systematically should be progressively embedded in scaling plans, as more ADTs are developed and used across schools over time.

Students have shown noticeable improvement in their listening and reading skills through regular use of ADT. Even learners who require additional support are now performing better due to the special features of ADT, such as audio reading and dictionary support, which help learners understand the text more easily. ADT caters to the needs of all learners and promotes equal learning opportunities in the classroom. Overall, student engagement has increased, and learners enjoy reading texts digitally. Interactive features such as quizzes and highlighted reading have helped improve literacy skills and motivation to learn.

Teacher, inclusive school, Thimphu Thromde

I could see improvements in students' reading. They can find the word meanings in the ADT easily. Usually, students from lower primary classes don't know how to use dictionaries. Now, through ADT, they know word meanings easily and word pronunciations.

Teacher, general school, Paro

What are the challenges experienced by students and teachers when using the ADTs in the classroom?

Insights from the FGDs show that while teachers recognize the potential of ADTs to enhance inclusive education, they encountered several obstacles that limited their effective implementation in everyday classroom practice. The summary table below outlines the main challenges reported by teachers and the improvements they recommended (see *Table 1*), which are further developed subsequently.

Table 1. Teacher-reported challenges and recommendations for accessible digital textbook (ADT) implementation

Type	Challenge reported	Suggested solutions
School infrastructure and hardware	• ICT labs unavailable or booked, limiting access to short/irregular time slots for ADT sessions. • Overlapping audio from devices creates noise and distraction in the classroom.	• Enable offline access so ADTs can be used in regular classrooms. • Schedule block periods for ADT lessons. • Provide headphones for students.
Software	• Teachers had to install Thorium EPUB reader themselves due to lack of ICT staff or staff availability. • Thorium EPUB reader was sometimes missing or uninstalled on computers, causing lesson delays.	• Ensure school-level ICT support.
ADT content	• Limitations in the Dzongkha version of the ADTs, due to the unique syllabic structure of the language. • ADTs only have static images.	• Integrate syllable-level audio support. • Add videos and animations to enhance storytelling and comprehension.
ADT accessibility features	• Sign language videos sometimes do not match text or hide it when in full screen. • Audio narrations are too fast for some learners.	• Align sign language videos precisely with text. • Display sign language video and text side by side. • Add a slow down audio functionality.
Classroom management	• Students' high enthusiasm for the ADTs sometimes resulted in off-task exploration of features, affecting lesson flow.	• Train teachers in classroom management strategies for ADT activities.
Student readiness	• Some students, especially those with disabilities, need more time to learn ADT navigation and accessibility features.	• Conduct ADT orientation sessions for students. • Implement a 'buddy system' for peer-to-peer support on ADT use. • Provide guidance to parents on how to install Thorium EPUB reader to use ADTs at home.

Sources: FGDs with teachers and teacher journals

Teachers faced persistent infrastructure and software barriers that limited effective ADT implementation in the classroom.

In FGDs, teachers reported that ICT labs were often unavailable or already booked for other lessons, restricting access to short or irregular time slots that made it difficult to conduct continuous ADT sessions. To address these constraints, many teachers suggested enabling offline access so ADTs could be used in regular classrooms or scheduling a dedicated block – two continuous periods – to ensure sufficient, uninterrupted time for instruction. Several teachers also noted that they had to manage software requirements

themselves, as schools lacked ICT lab staff or they were busy. This meant installing the Thorium EPUB reader on all computers and checking that each device was functioning properly, substantially increasing their preparation time beyond regular lesson planning. Some teachers additionally reported that the software was occasionally missing from lab computers – often because it had been accidentally uninstalled by students – resulting in delays at the start of lessons while they restored or reinstalled the software.

The above challenges point to the need for dedicated ICT support staff in schools, alongside clear device management plans that address maintenance, monitoring, and the recurring costs of ICT equipment – reducing the administrative burden on teachers and enabling them to focus on instruction rather than technical troubleshooting. The MoESD should provide guidance, resources and structured support to schools on ICT management, including orientation to head teachers on how to develop action plans to manage and sustain ICT infrastructure. Head teachers, in turn, play a key role in ensuring ICT labs are effectively scheduled and accessible for ADT use, and in championing the integration of digital tools as part of the school's broader commitment to inclusive education.

It happened mostly in the ICT lab because at that time the smartboard was not installed in the classroom. I had to adjust periods since the ICT labs were used by other classes. I had to check when the ICT labs were free, and the ICT teachers were conducting professional development, so that I can take my students for the ADT lessons. Later on, when we had an interactive board installed [in the classroom], we had ADT lessons anytime.

Teacher, inclusive school, Thimphu Thromde

Teachers also faced important content-related challenges – such as language-specific limitations in the Dzongkha materials – that affected the usability and accessibility of the ADTs. In FGDs, teachers highlighted that the unique structure of the Dzongkha language posed barriers for early readers. Because it is a syllabic language, they explained that breaking words into syllables would significantly support students who are still developing decoding skills or who struggle with pronunciation. Although teachers acknowledged that integrating syllable-level audio into the ADTs would be technically complex, they emphasized its importance for improving accessibility and comprehension. Additionally, several teachers suggested enriching the ADTs with videos and animations – rather than relying solely on static images and text – to make the content more engaging and better suited to young learners.

I was thinking, if the ADT The Yaks is in real video form or adding animation features, that would really help children learn with these stories better. I don't know how this is possible, but I am just thinking that this feature will be useful. The video or animations can cover the content better than text for students.

Teacher, inclusive school, Haa

Teachers identified issues with the accessibility features that limited the effectiveness of the ADTs for learners with diverse needs.

In FGDs, some noted that sign language videos did not always play alongside the corresponding text, and in certain cases, the signs did not accurately match the written content, creating confusion for students with hearing disabilities who rely on precise visual interpretation. Some teachers also observed that the default audio narration was sometimes too fast for learners who require more processing time or who struggle with information retention. To address this, they recommended adding a functionality to slow down audio playback, ensuring that students can follow the narration at a pace suited to their needs. Based on teacher feedback during the ADT pilot, these content-related and accessibility feature considerations should guide the development of new ADTs, the improvement of existing ones, and the design of other digital learning tools by the MoESD and other publishers.

While playing the sign language video on full screen, it hides the text behind the video. Students cannot see the text as they watch the sign language video. So, if there is way to show both the sign language video and text side-by-side, it will be helpful to the students to connect the sign and the text.

Teacher, special institute, Paro

Teachers also encountered classroom management difficulties, particularly in keeping students focused and managing distractions during ADT activities.

In FGDs, several teachers reported that students without disabilities often became overly excited by the digital tools, exploring features independently and losing focus on the lesson or the teacher's instructions. Although this enthusiasm reflects interest in the ADTs, it made it difficult for teachers to direct the class effectively and maintain students' attention. Many teachers also emphasized the need for headphones, as simultaneous use of individual devices created overlapping audio in the classroom. The resulting noise disrupted lessons and reduced concentration for students with and without disabilities, further complicating classroom management during ADT sessions.

In the classroom, when every student is exploring the different ADT features, the classroom gets noisy and disturbs the lesson. Due to this, teachers and students said that they need headphones to control the class better. These difficulties have been faced in the beginning, but later, class teachers were able to solve it by controlling students' behaviour.

Teacher, inclusive school, Haa

Teachers also highlighted the need for dedicated orientation to ensure students could navigate the ADTs effectively. In FGDs, several noted that many students – particularly those with disabilities – required additional hands-on practice before engaging with ADTs content. These students often needed more time to learn how to operate the devices, navigate the ADT, and use its accessibility features with confidence. In response, some teachers organized orientation sessions to familiarize learners with the tool, which helped them work more independently and reduced time lost during regular lessons. In certain schools in Thimphu Thromde, this support was extended to parents, with teachers providing guidance on ADT use and assisting families in installing the Thorium EPUB reader on their smartphones or tablets so students could continue practicing at home. This practice is a valuable example of home-school collaboration, recognizing parents as key partners in supporting their children's digital learning. Encouraging this approach more broadly among teachers, supported by simple guidance materials for families, could help students, particularly those with disabilities, build confidence and familiarity with ADTs beyond school hours. To further strengthen student readiness, some teachers also proposed implementing a 'buddy system', where students who are more experienced and comfortable with digital tools support peers who need additional help.

The first lesson in the inclusive class was difficult. With two students with learning difficulties and one with mutism, we had to orient them on Thorium and ADT features. That one period allotted for the lesson was all spent on this. We only had one period in two weeks of the ADT lessons. So, I had to use additional two to three periods from the Dzongkha lesson when the teacher was on leave to orient these students. With such interventions, the two students with learning difficulties improved in using the ADT, but the student with mutism was finding it a little difficult.

Teacher, inclusive school, Thimphu Thromde

Recommendations

This report presents findings from 19 schools across 9 districts observed during Bhutan's ADT pilot. The insights gathered aim to inform ongoing progress as the ADT initiative evolves and scales up nationally.

Overall, research findings reinforced that ADTs can be effective tools to support inclusive education. Teachers consistently observed increased focus, engagement and motivation among students with and without disabilities. Collaboration between them was also reinforced: students without disabilities often helped their peers with disabilities navigate the ADT and use its accessibility features. Additionally, ADTs also sparked curiosity among students without disabilities about how their peers with disabilities communicate and learn; for instance, some were eager to learn sign language from watching the embedded videos. However, teachers also noted that students encountered challenges when using the ADTs. These challenges were more pronounced for learners with disabilities such as autism, Down syndrome or multiple disabilities, who required one-on-one support as they faced more difficulties understanding the content and following the lessons. Other barriers such as unavailable ICT labs for ADT lessons, software installation issues and functional problems with some accessibility features were also reported.

These early results highlight not only the value of ADTs in addressing diverse learning needs, but also the importance of strengthening the conditions that enable their effective use in schools and classrooms. The following conclusions and recommendations draw on these pilot findings to guide improvements in ADT implementation, teacher training and support, and future development of accessible digital tools in Bhutan.

Recommendations are provided below for teachers, MoESD officers and technology developers, 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 functionalities of the ADT content and technology.

1. Recommendations for teachers utilizing ADTs and other digital technologies in the classroom, based on practices observed during the ADT implementation:



- **Introduce ADTs gradually to students with and without disabilities.**

Teachers reported that some students – particularly those with disabilities – needed more time to familiarize themselves with the ADTs. Teachers should implement strategies to support a step-by-step introduction to the new technology, allocating dedicated time at the beginning of initial lessons specifically for familiarization – allowing students to explore the digital tool, navigation buttons and accessibility features before engaging with curriculum content in more depth. This can be complemented by guided demonstrations, peer-to-peer support, and ongoing reminders and assistance throughout sessions to help ease the transition from guided use of ADTs to more independent navigation and interaction.



- **Support parents to use ADTs at home to reinforce students' learning beyond the classroom.**

Teachers should actively engage parents in understanding and using ADTs so learning can continue beyond the classroom. This may include practical demonstrations on how the ADTs work, sharing simple guidance for installation and home use and encouraging parents to explore ADT activities with their children. Strengthening home and school collaboration helps reinforce skills, increases students' comfort with the technology, and promotes consistent learning experiences across settings.

2. Recommendations to MoESD to adjust teacher training and professional development:



- **Provide ongoing professional development for teachers focusing on inclusive teaching strategies and effective technology use.**

Teachers reported particular challenges in supporting students with autism, Down syndrome, and multiple disabilities during ADT sessions – highlighting the need for more targeted and disability-specific pedagogical guidance. Professional development opportunities should equip teachers with the knowledge and skills to adapt instruction to diverse learning needs, apply UDL principles, integrate ADTs into their lesson planning, create inclusive classroom environments, and use technology to support accessibility and participation for all learners. This content should be embedded in both pre-service and in-service teacher training programmes, across all levels

of education (from pre-primary to grade 12) and all subjects, to ensure that inclusive teaching becomes a core and sustained competency across the workforce.



- **Incorporate more hands-on activities into ADT teacher training.**

Teachers valued the ADT training but reported that additional practice time would have strengthened their confidence and readiness to use ADTs independently in the classroom. Training should therefore move beyond familiarization with the technology to include structured opportunities for teachers to apply what they have learned – such as collaboratively developing lesson plans that integrate ADTs with facilitators and teacher colleagues, followed by peer feedback and time to refine their approach. Dedicated time should also be allocated to exploring each accessibility feature in depth, so that teachers feel equipped to use them purposefully and adapt them to the diverse needs of their students. Embedding this hands-on approach into ADT training design will help bridge the gap between training participation and classroom readiness.



- **Facilitate mechanisms for peer support on ADT use among teachers.**

Establishing opportunities for collaboration at the school level can strengthen implementation by enabling teachers to share knowledge, good practices and experiences. Head teachers can promote channels within schools for teachers to exchange practical strategies and lesson plans that integrate ADTs. Guidance on how to do so effectively should therefore be embedded into head teacher training, equipping school leaders with the tools and confidence to foster a culture of peer learning. At the system-level, the MoESD can further support this process by disseminating examples of effective classroom use as pedagogical guidance, either through developed materials or during district officer visits. This peer-learning approach not only boosts individual teacher skills and confidence but also contributes to a more coherent and effective use of ADTs across schools.



- **Monitor teachers' digital skills and ADT usage through routine school- or district-level assessments, to identify areas for additional training and support.** Head teachers and district officers can embed this process into their existing monitoring mechanisms, using tools such as checklists or classroom observations, to gauge how confidently and effectively teachers are integrating ADTs into their lessons. These insights help to identify specific gaps or challenges, enabling education systems to provide targeted training, coaching and resources that respond directly to teachers' needs.

3. Recommendations to MoESD to enhance the ecosystem for digital education:



- **Provide additional support to schools for managing ICT devices, which in turn will enable them to provide support for teachers.** In many schools, teachers are currently responsible for device preparation and management due to the absence of dedicated ICT staff, adding to their workload and reducing time for instruction. The MoESD should establish device management plans that address maintenance, monitoring and technical support, and allocate ICT support staff to schools, when possible. Budget planning cycles must account for both one-time and recurring costs associated with ICT equipment, to ensure the long-term functioning of digital infrastructure in schools.



- **Guide and support head teachers to integrate accessible digital materials in their schools.** Head teachers play a key role in encouraging the use of digital tools to support inclusive education, and in developing action plans to manage, monitor and sustain their use. The MoESD should embed guidance on ADT integration and ICT management into head teacher training, equipping school leaders to effectively schedule and manage ICT labs, support teachers in incorporating ADTs into their lesson planning, provide feedback to teachers for ADT implementation, and champion inclusive digital learning across their schools.



- **Integrate the production of accessible learning materials into existing policies and budget arrangements to enhance inclusive education in Bhutan.** Ensuring equitable availability of accessible materials for all students – regardless of school type, education level, subject or disability type – requires moving beyond isolated provision and embedding accessible material development into routine curriculum and budget planning cycles. Building on the foundation of the ADT pilot, the MoESD should develop a progressive pipeline for producing, distributing and regularly updating accessible materials, reaffirming the commitment to provide inclusive education for all learners.

4. Recommendations to technology developers to improve the user experience of ADTs and other digital tools:

Based on feedback from teachers during the ADT pilot, the following considerations should guide the improvement of ADTs and the development of new ones as well as other digital learning tools:



- **Ensure sign language videos** are precisely aligned with the accompanying text and display the video and text side by side for easier comprehension.



- **Include adjustable audio-speed functions** so learners who need more time can slow down the narration.



- **Improve the Dzongkha version of the ADTs**, taking into account the linguistic structure and specific characteristics of the language.



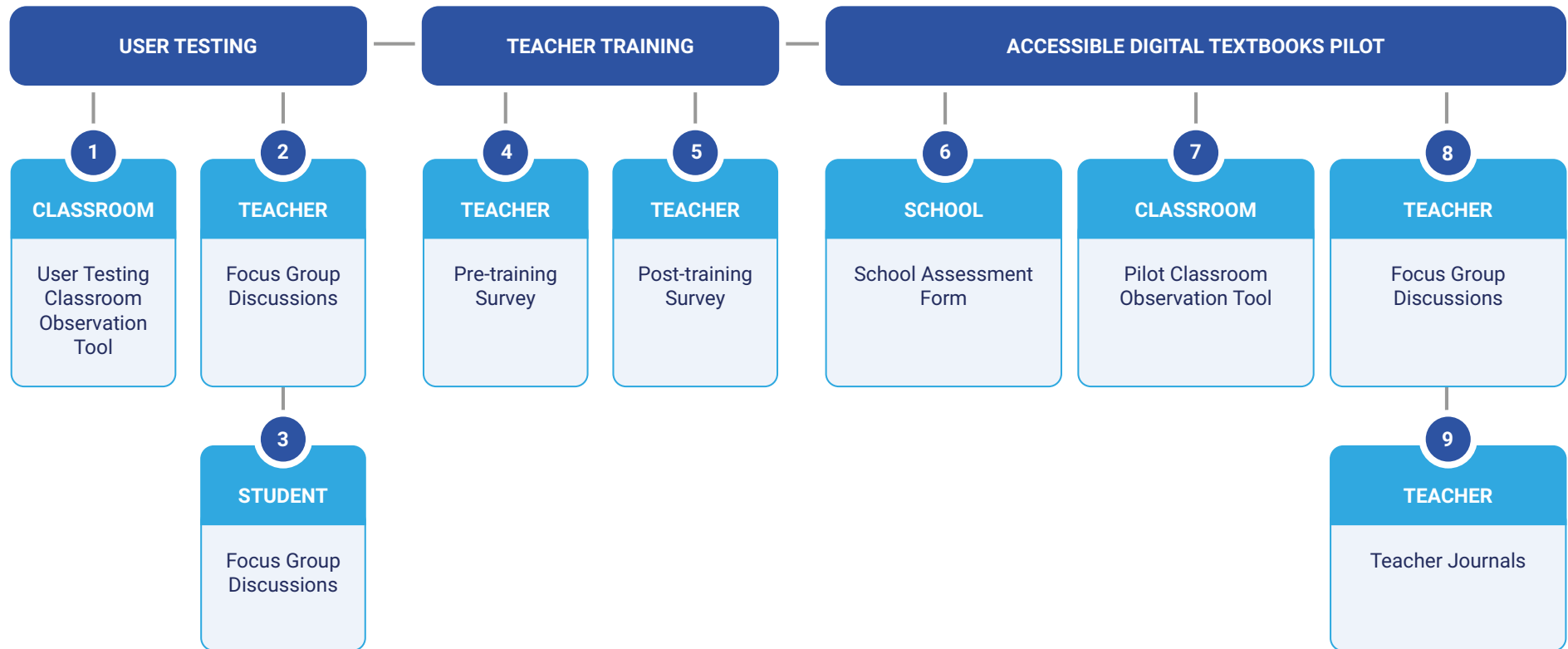
- **Increase the use of visual elements in the ADTs**, such as videos and animation, to complement static images and enhance students' understanding and engagement.

Annexes

Annex 1: Participating schools

School type	District	Number of students with disabilities enrolled
Inclusive	Thimphu Thromde	27
Inclusive	Thimphu Thromde	12
Inclusive	Thimphu Thromde	2
Inclusive	Thimphu Thromde	28
Inclusive	Thimphu Thromde	6
Inclusive	Phuentsholing Thromde	16
General	Paro	0
Special institute	Paro	29
Inclusive	Paro	17
General	Haa	0
Inclusive	Haa	7
General	Haa	0
Inclusive	Punakha	4
Inclusive	Thimphu Dzongkhag	6
General	Thimphu Dzongkhag	0
Special institute	Trashigang	7
Inclusive	Chhukha	6
Inclusive	Wangdue	7
Inclusive	Wangdue	12

Annex 2: Data collection tools mapping in Bhutan



Abbreviations

ADT	Accessible Digital Textbook
FGD	Focus Group Discussion
MoESD	Ministry of Education and Skills Development
ROSA	Regional Office of South Asia
UDL	Universal Design for Learning

References

- 1 United Nations Children's Fund, *Seen, Counted, Included: Using data to shed light on the well-being of children with disabilities*, UNICEF, New York, 2021.
- 2 UNESCO, *Global Education Monitoring Report 2020: Inclusion and Education: All Means All*, UNESCO, Paris, 2020.
- 3 Grimes, P., et al., *Disability-Inclusive Education Practices in South Asia*, United Nations Children's Fund Regional Office for South Asia, Kathmandu, 2021.
- 4 Ministry of Health, *'5th National Health Survey. Integrated Stepwise Household Survey 2023'*, Royal Government of Bhutan, Thimphu, Bhutan, 2023.
- 5 Grimes, P., et al., *Disability-Inclusive Education Practices in South Asia*, United Nations Children's Fund Regional Office for South Asia, Kathmandu, 2021.
- 6 Ministry of Health, *'5th National Health Survey. Integrated Stepwise Household Survey 2023'*, Royal Government of Bhutan, Thimphu, Bhutan, 2023.
- 7 Ministry of Education and Skills Development, *'The Annual Education Statistics 2024'*, Royal Government of Bhutan, Thimphu, Bhutan, 2024.
- 8 Ministry of Education and Skills Development, *'National Policy on Special Education Needs'*, Royal Government of Bhutan, Thimphu, Bhutan, 2012.
- 9 Grimes, P., et al., *Disability-Inclusive Education Practices in South Asia*, United Nations Children's Fund Regional Office for South Asia, Kathmandu, 2021.
- 10 Ministry of Education and Skills Development, Department of School Education, ECCD and SEN Division, *'Ten-Year Roadmap for Inclusive and Special Education in Bhutan'*, Royal Government of Bhutan, Thimphu, Bhutan, 2018.
- 11 Ministry of Education and Skills Development, *'The Annual Education Statistics 2024'*, Royal Government of Bhutan, Thimphu, Bhutan, 2024.
- 12 Grimes, P., et al., *Disability-Inclusive Education Practices in South Asia*, United Nations Children's Fund Regional Office for South Asia, Kathmandu, 2021.
- 13 Grimes, P., et al., *Disability-Inclusive Education Practices in South Asia*, United Nations Children's Fund Regional Office for South Asia, Kathmandu, 2021.
- 14 Ministry of Education and Skills Development, Department of School Education, ECCD and SEN Division, *'Standards for Inclusive Education'*, Royal Government of Bhutan, Thimphu, Bhutan, 2017.
- 15 Grimes, P., et al., *Disability-Inclusive Education Practices in South Asia*, United Nations Children's Fund Regional Office for South Asia, Kathmandu, 2021.
- 16 UNICEF Office of Strategy and Evidence – Innocenti, *'Working Paper. Testing Digital Accessibility in Education: The Case of the Dominican Republic'*, UNICEF Innocenti, Florence, 2025.
- 17 UNICEF Office of Strategy and Evidence – Innocenti, *'Accessible Digital Textbooks Jamaica. Creating digital tools to enable inclusive education'*, UNICEF Innocenti, Florence, 2023.
- 18 UNICEF Office of Strategy and Evidence – Innocenti, *'Digital Learning in Lebanon: Lessons from the Madristi digital learning proof of concept'*, UNICEF Innocenti, Florence, 2026.
- 19 UNICEF Office of Strategy and Evidence – Innocenti, *'The Impact of Digital Learning in Mexico: Findings from an experimental study of the Learning Passport'*, UNICEF Innocenti, Florence, 2026.
- 20 UNICEF Office of Strategy and Evidence – Innocenti, *'Accessible Digital Textbooks Paraguay. Creating digital tools to enable universal design for learning and inclusive education'*, UNICEF Innocenti, Florence, 2025.

Acknowledgements

This report was planned and developed by UNICEF Office of Strategy and Evidence – Innocenti and UNICEF Office of Innovation – Learning Innovation Hub, under the supervision and guidance of Linda Jones and Thomas Dreesen (UNICEF Innocenti) and Julie De Barbeyrac (UNICEF Learning and Innovation Hub). The report was written by Stefania Vindrola and Marta Carnelli (UNICEF Innocenti), and Thinley (UNICEF Bhutan). Qualitative and quantitative data were collected by Thinley (UNICEF Bhutan) and Sonam Tshering (Ministry of Education and Skills Development, Bhutan).

Special thanks go to the team from the Department of School Education at the Ministry of Education and Skills Development, Bhutan, including the Centre for School Curriculum Development and the Early Childhood Care and Development and Special Education Needs Division, who supported coordination and implementation of the fieldwork.

Additional thanks are extended to Ravindra Kumar Sah (UNICEF Regional Office for South Asia) and Bishnu Bhakta Mishra (UNICEF Bhutan) for their coordination support, to Sophia Torres for her support in tool development, and to Sara Saljic (UNICEF Office of Innovation) for her review and insightful comments on this report.

The authors also wish to express their gratitude to all the head teachers, teachers, students and parents who generously participated in this research.

Copy-editing: Accuracy Matters

Layout Design: Afternorth

Photography:

Page 9: © UNICEF/Kuenga Wangchuk

Page 17: © UNICEF/Thinley

Page 23: © UNICEF/Thinley

Page 30: © UNICEF/Dorji Dendup

About us

UNICEF, the United Nations agency for children, works to protect the rights of every child, everywhere, especially the most disadvantaged children and in the toughest places to reach. Across more than 190 countries and territories, we do whatever it takes to help children survive, thrive, and fulfil their potential.

UNICEF Office of Strategy and Evidence – Innocenti accelerates progress for children by working to ensure that policies and programming are informed by high-quality evidence. As the global custodian of child-related official statistics, it works closely with governments and partners to strengthen national statistical systems. Through world-leading data, research and foresight, it underpins UNICEF's global leadership on children's rights and serves as the organization's hub for setting strategy and monitoring programmes. With the active engagement of young people and other partners, it supports advocacy and dialogue aimed at improving the lives of children everywhere.

Published by

UNICEF Office of Strategy and Evidence – Innocenti

Via degli Alfani, 58
50121, Florence, Italy

Email: innocenti@unicef.org

Web: unicef.org/innocenti | data.unicef.org

Social media: @UNICEFInnocenti on [Bluesky](#), [Instagram](#), [LinkedIn](#), and [YouTube](#)

Suggested citation

Vindrola, S., Carnelli, M., and Thinley, 'Using Digital Tools to Enable Inclusive Education in Bhutan: Lessons from the Accessible Digital Textbooks Pilot', Working Paper, UNICEF Innocenti, Florence, September, 2026.

© United Nations Children's Fund (UNICEF), September 2026. Except for the UNICEF logo, photos and where another © appears, this work is licensed under [CC BY 4.0](#). The UNICEF logo and enclosed photos may only be used in exact copies of the publication. Where another © appears, you must ask the listed copyright holder to use the item outside exact copies of the publication.

for every child, **answers**

