Assistive Technology Resources

Department of Inclusive Education

Ministry of Education

2022

⠠⠁⠎⠎⠊⠎⠞⠊⠧⠑ ⠠⠞⠑⠉⠓

⠠⠝⠕⠇⠕⠛⠽ ⠠⠗⠑⠎⠕⠥⠗⠉⠑⠎

⠠⠙⠑⠏⠁⠗⠞⠍⠑⠝⠞ ⠕⠋ ⠠⠊⠝⠉⠇⠥⠎⠊⠧⠑ ⠠

⠠⠍⠊⠝⠊⠎⠞⠗⠽ ⠕⠋ ⠠⠑⠙

⠼⠃⠚⠃⠃

1. Background

The concept of Assistive Technology (AT) will provide equal educational opportunities for all students, increase their participation in learning and enhance their knowledge. The Assistive Technology Act of 2004, an assistive technology device is "any item, piece of equipment or product system, whether acquired commercially off the shelf, modified, or customised, that is used to increase, maintain or improve functional capabilities of individuals with disabilities."

This technology will support and make a big difference in the students' lives as it accommodates individual cognitive and physical needs. It also has several benefits and has shown upward demand in its use around the world.

The Education Act of the Maldives 2020/24 focuses on the accessibility of information. Article 8 of the Act ensures that students with disabilities are given the necessary amenities to learn.

The National Curriculum Framework (2015) encourages implementing diversity in the teaching process. The Framework also recognizes the usage of technology as one of the most crucial competencies.In the spirit of Goal 4 of the Sustainable Development Goals, the Education Sector Plan (MoE & MoHE, 2019) emphasises the usage of assistive technology to facilitate inclusion.

In addition to that, the Inclusive Education Policy (2021) also obliged to provide assistive technology to students with disabilities. Article 8 of the Policy mentions that all students with disabilities should be provided with necessary ICT products and responsible parties should use technological advancements to teach students with disabilities.

The convention on the Rights of Persons with Disabilities also recognizes the critical role information technology plays in the life of students with disabilities. Articles 4,9,20,26 and 32 call on State Parties to provide access and facilitate affordable access to assistive technology to all people with disabilities.

The Department of Inclusive Education (DoIE) and Shamilveshi schools are mandated to create inclusion awareness among schools, families, and communities

and provide professional development to relevant stakeholders. Hence, it is the responsibility of the department and Shamilveshi schools to provide the necessary technology for students with complex learning profiles to improve their quality of education. To be successful in school, students with complex learning profiles require specialised and accessible learning material. This document intends to provide a standard listing of the different types of AT products and devices to complement the needs of the students with disabilities.

2. Levels of Assistive Technology

Assistive technologies are often divided into three categories based on the technological difficulty and the level of training required to utilise the AT resource. Namely high tech devices, mid tech devices and low tech devices. Low tech devices are also referred to as no tech devices because this category of devices do not require electrical power or are not mechanical in nature. Rather these devices are rather physical objects that can assist to focus, handle objects or provide an aid to learning.

3. Assistive Technology Resources

A list of specific devices for AT resources would be exhaustive. The specific device for the user is dependent on various factors such as user preference, the subject and content being used and the capabilities of the user, i.e. the level of blindness differs in individuals with the visual impairment, the level and type of dyslexia differs in individuals with the learning impairment. This document attempts to compile a list of resources based on the types or the broad categories the device comes under, the type of aid and the technology used.

The categorisations noted in this document are based on the type and functions of the resources and are categorised as seen appropriate by the DoIE. The list below is only one presentation of the AT resource types with the focus on learning assistive devices.

"Aid" in the following list represents the type of impairment that the particular type of resource is targeted to address.

"Technology" represents the level of complexity of the stated resource as indicated under *Levels of Assistive Technology* heading above.

3.1. Resources list with examples

1   Manipulatives

Manipulatives is a broad range of no-tech assistive technology for education. These are physical objects that can assist students with their learning activities. These include numeracy learning resources and basic reading tools such as phonetics cards and picture and word cards can also be considered the same.

Aid: Learning   Technology: Low

Examples:
Time flips, MathLink cube builders, Puzzles, Calendar boards, Blocks, Abacus, Number kits

Source: homeschoolgiveaways.com

2   Symbols and signage

Arrangement of assigning codes, labels and abbreviations to represent a place, item or message. This includes the various logos and symbols that we use in our day to day life such as the "P" symbol for the representation of a parking area. Schools offering SEN services can increase the use of coding systems to assist students with disabilities to identify messages/places when labelled with text and can help communicate more effectively.

Aid: Learning   Technology: Low

Examples: Exit indicators, Cafeteria signage, First aid room sign, Staff room signage

Source: thenounproject.com

3   Reading rulers

A reading ruler is a tool that helps students to focus on a line of text when reading. Special reading rulers are now available as highlight colour strips, to highlight the text to focus on. Equipment such as normal rulers, bookmarks or paper strips were traditionally used for the same function to underline the line of text to focus on. Reading rulers were first introduced as a physical device. However due to the growth in reference to digital content, various virtual ruler applications are also now available. Various SEN enabled websites also have embedded reading ruler features.

Aid: Learning   Technology: Low to mid

Examples: Cooler Ruler Reading Ruler, Westcott Data Processing, Magnifying Ruler, Koogel Reading Guide Strips, Reading ruler Chrome extension, Virtual reading ruler by Crossbow education

Source: eduromp.com

4 Sensory tools

Sensory tools are intended to promote regulation, improve focus, and increase participation to enable and improve learning (Ford-Lanza, 2018). Sensory tools include technology from low to mid. Sensory tools include a wide variety of tools including: modelling clay, massage rollers, hedgehog balls, sand timers, sensory lights, liquid floor tiles, interactive floor tiles, bubble tubes etc.

Aid: Learning, physical   Technology: Low

Examples: Visual effects sensory bag, Tactile sensory bag, Sensory cascade, Bubble tubes, Colour changing tools

Source: fledglings.org.uk

5 Adapted furniture and support

Adapted furniture is modified furniture to support the physically impaired. This could include wheelchairs or ergonomically modified chairs and tables. Alternatively this could be chairs with non-slip surfaces.

In addition to furniture, certain support accessories might be needed depending on the individual. This may include bolsters for positioning, head support, straps, standing frames etc.

Aid: Physical   Technology: Low

Examples: Riser recliner chairs, Over chair tables, Non-slip surfaces, Head support, Foot rests

Source: adaptivespecialties.com

6 Adapted stationary

Generic tools and equipment might not be suitable for children with special needs. These include the pen, pencil and scissors to name a few. Adapted stationery are developed to complement the SEN users with physical impairments (e.g. weak hands). These specially designed tools relieve stress and fatigue for such students.

Aid: Physical   Technology: Low

Examples: EasiGrip scissors, PETA long scissors, PenAgain Ergo-sof
Stabilo easy original pen

Source:penagain.net

7 Augmentative and alternative communication (AAC) devices

AAC devices provide a means to communicate for people having trouble with speech. AAC includes no-tech means of communication such as writing, drawing or hand gestures. AAC devices are the mid to high tech developments to AAC, such as communication devices with the basic words and sound inbuilt with recording features, mobile apps etc.

Aid: Speech   Technology: Low to high
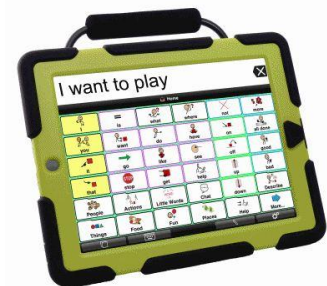
Source:theautismhelper.com

Examples: GoTalk, Communication kits, MegaBee assisted communication tablet, Proloquo2Go, Tactile symbol communicator, Big talk assistive technology communicator

8 Big button calculators
The mildly visually impaired can benefit from calculators with larger keys with bigger digits when the normal devices are difficult to use.

Aid: Visual   Technology: Low

Examples: SciPlus low vision scientific calculator, 8 digit low vision calculator, Big button coloured calculators

Source: catiga.com.cn

9 Large printed material
Large print materials are the most basic and affordable means to provide support to the visually impaired.

Aid: Visual   Technology: Low

24 point 27 point, 30 point. 32 point, 36 point. 40 point text. 42 point text. 46 point text. 48 point text. 50 point text. 54 point text. 57 point text. 60 point text. 64 point text. 70 point

10 Audio content
TTS and recorders are a means to students with disabilities to access content and make notes respectively. However, the need for such devices or the effort and time put in by students to access these resources can be minimised by having the content or material available to them in audio format.

Aid: Learning   Technology: Mid

Examples: LibriVox (public domain audio books), Internet Archive, Audible by Amazon, Scribd, Content specific audio books/files (developed by specific organisations)
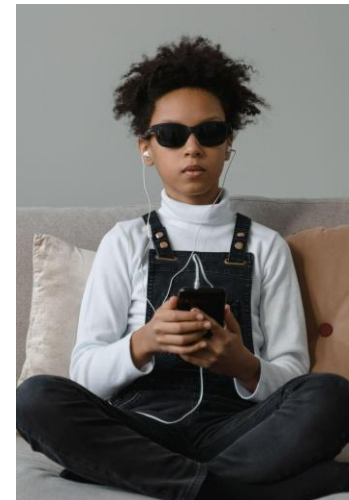
Source: pexels.com

11 Early learning software
Early learning software are programs designed with graphics, audio and video to assist learners in a particular subject. Though many of these software do not specifically relate with SEN, a good amount of these software comes in useful for SEN students.

Aid: Learning   Technology: Mid

Examples: ABC Maestro, Number Shark, Word Shark, Typing Instructor for Kids

12 Literacy support software

These are software programs providing learning support for the students with disabilities. These programs more commonly consist of a composite of word processing, TTS and STT capabilities.Literacy support software are mostly developed to work with the commonly used word processors such as Microsoft Word and Google Docs.

Aid: Learning   Technology: Mid

Examples: ClaroRead Plus, TextHelp, Read & Write, Natural Reader, KurzWeil 3000

13 Symbol writing programs

Symbol writing programs are software applications that display relative symbols with the text. Symbol writing programs are helpful for students with language and communication difficulties. Modern symbol writing programs offer a smart symbolising feature that automates the generation of suitable symbols for the text.

Aid: Learning   Technology: Mid

Examples: SymWriter 2, Widgit writer
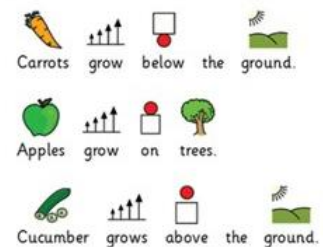
14 Touch typing programs for SEN

Touch typing is the term used to describe typing using all fingers and without looking at the keyboard. This is done by training to type by learning the positions of the keys through practice. Touch typing software developed in consideration to students with learning difficulties is important as many software are also available for the generic user.

Aid: Learning   Technology: Mid

Examples: KAZ typing tutor, Five finger typist, EnglishType

15 Visual organisers and scheduling programs

Visual organisers and scheduling programs can assist students with language difficulties to keep track of information and tasks. These programs provide a means to the students to organise the information with less text which could help them in their learning process.

Aid: Learning   Technology: Mid

Examples: Ayoa software, Twinkl task board, Visual schedule
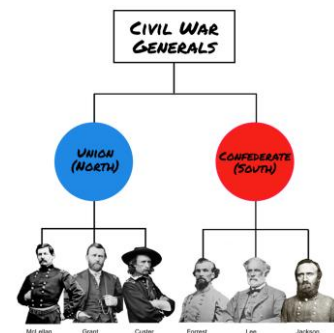
16 Word prediction programs

These are programs that predict the words being typed as the students are typing on an electronic device. Smart phones and word processors now come with features inbuilt for word prediction. However, there are software that go beyond the functionality of general word processing software that can further assist the SEN user, such as suggesting words often used by the user, reading words out loud during the typing process, using symbols and pictures to represent words etc.

Source: cricksoft.com

Aid: Learning   Technology: Mid

Examples: LightKey, Clicker 8, Turbo Type, Windows 10 On-screen keyboard

17 Alternative keyboards and mice

Alternative keyboards and mice are devices that offer differentiated access or functionality to those who have difficulties in accessing the conventional keyboards and mice. This includes keyboards with larger keys and letters, colour coded keyboards, backlit keyboards etc depending on the type of disability that needs to be addressed. Similarly the mice may come in with extra buttons, be presented in as touchpads, trackballs and joysticks.

Aid: Learning, visual   Technology: Mid

Source: maltron.com

Examples: Jumbo XL II keyboard, Maltron single hand keyboard, Helpikeys, Springboard keyboard, Abili head mouse, 3M Renaissance mouse, Bili foot mouse, Boomer foot mouse

18 Text to speech (TTS) software

TTS converts on-screen text to audible speech. TTS is the most affordable and useful when it comes for the visually impaired to read documents.

Aid: Visual   Technology: Mid

Examples: Balabolka, Natural reader, Dolphin screen reader, Voice dream, WordTalk

19 Speech to text (STT) software

STT is the counterpart to TTS for the visually impaired that converts spoken speech to text on a digital device. Speech-to-text is also referred to as speech recognition.

Aid: Visual   Technology: Mid

Examples: Converse smartly, Microsoft dictate, Google docs voice typing, Windows speech recognition, English voice typing keyboard

20 Talking calculators

Talking calculators are calculators with built-in speech synthesisers to vocalise the numbers, operations and symbol keys a user presses and also reads out the result of the calculation. Some of these devices also come with a stereo port for headphone connectivity.

Aid: Visual   Technology: Mid

Examples: Jumbo talking calculator, Pocket size talking calculator Desktop talking calculator, Orion talking scientific calculator, Reizin 12 digit talking calculator

Source: globalsources.com

21 Voice recorders/recording devices

Voice recorders are a simple but great tool for students with disabilities to take notes during active classes and sessions. Voice recorders have now in-built speakers and stereo headphone jacks for students to be able to listen to the recorded audio resources without the need for movement of the files or connecting to another device.

Aid: Visual   Technology: Mid

Examples: Sony ICD-UX570 Digital Voice Recorder, Atto Digital TileRec, Garmay Digital Voice Recorder


Source: sony-asia.com

22 Optical character recognition (OCR)

OCR devices recognize text on hard copies and convert them to digital or computer editable texts. OCR functions were first introduced in some paper scanners or they come with additional firmware functions to add the OCR capability. Scanners are more convenient when scanning whole pages or documents. Portable OCR scanners are now available for scanning text selectively. These devices can help students with language (reading/writing) difficulties as well as the visually impaired i.e. TTS software can be used to read text once converted to digital format using the OCR device. Some OCR devices even come with TTS functionality eliminating the need for additional devices and software. OCR devices now range from portable handheld devices that read out lines to reading machines that could read inserted documents or books.

Aid: Learning, visual   Technology: Mid to high

Examples: WorldPenScan Go, C-Pen Readers, OrCam Read, OrCam MyEye, ABiSee eye pal solo, PEARL portable reading camera
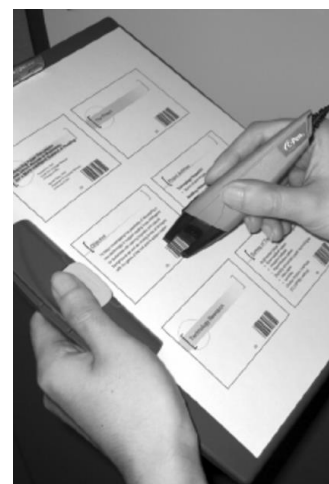
Source: researchgate.net

23 Assistive technology kits

AT kits are a collection of alternative devices (keyboards. mice, rollerballs, switches etc) that complement each other to provide the functionality to students who have difficulty in using the conventional devices. An AT kit can be beneficial when the student in question might need more than just an alternative keyboard or

mice or when the capabilities of the student need to be analysed.

Aid: Learning, physical   Technology: High

Examples: SimplyWorks classroom kit, AT Basic skill bundle, AT early learning starter bundle, AT older learner start kits

24 Electronic maths worksheets

Electronic maths worksheets are software programs that help students align formulas, work through problems and organise their thoughts in a single space (Maza, 2022). Electronic maths worksheets work with TTS software by reading maths problems aloud.

Aid: Learning, visual   Technology: High

Examples: Matific, Mathtalk, Sparks Maths

25 Adaptive switches

Adaptive switches are keyboard and mouse emulation devices designed to provide the functionality of the keyboard and mouse for the individuals who are unable to use the conventional keyboard and mouse. Different types of switches are available to address persons with different capabilities. These devices interact with the computer through an AT switch interface connected to the computer.

Aid: Physical   Technology: High

Examples:
Sip and puff switches, Grip and puff switches, Cushion grip switches, Pal Pad assistive switches, Mini cup switches, Pillow switches, Chin switches

26 Eye-tracking technology

Eye-tracking technology enables users to control the computer using eye movements. This technology is highly effective to enable students with physical impairments and is unable to use the mouse and keyboard. Eye tracking primarily allows the user to control the cursor. This in turn also allows the user to select items on the screen and type either using on-screen keyboard or customised keyboards or symbol writing programs.

Aid: Physical   Technology: High

Examples: Tobii I-Series devices, Gazepoint GP3, Smart Eye AI-X, Argus Science D6, Eye Tribe Tracker
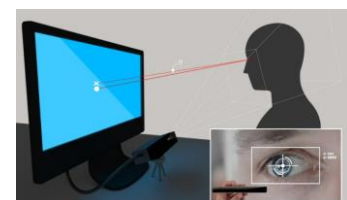
27 Braille devices

Braille is the reading and writing language used by the visually impaired containing embossed dots arranged in rows and columns (S and Ravikumar, 2014). Braille devices can range from high tech to low tech. Braille devices range from printers, keyboards, digital readers to braille printed documents. Listed below are the high tech interactive braille gadgets.

Braille keyboards have braille symbols embossed on to the keys for the visually disabled to be able to type in text using computers.
Braille displays output text from a computer line by line by raising and lowering dots on the device to form the braille patterns for touch reading. Braille displays often come as an extension of the keyboard.

Braille printers/embossers produce hard copies of braille documents for easier reading. This could especially be useful when reading long texts as with the braille displays, the display unit needs to be refreshed every time a line is read.

Source: specialneedscomputers.ca

Aid: Visual   Technology: High

Examples:
QBraille XL Keyboard, PC Nero slim line keyboard, HIMS Smart Beetle, Actilino, Braille Wave, Chameleon 20, Braillo 200, Gemini, Thomas

References

'Assistive Technology Resource Guide 2013.pdf' (no date). Available at:
https://www.ocali.org/up_doc/AT_Resource_Guide_2013.pdf
(Accessed: 28 June 2022).

Braille | National Federation of the Blind (no date). Available at:
https://nfb.org/resources/braille-resources (Accessed: 21 June 2022).

'braillebasic.pdf' (no date). Available at:
http://brailleauthority.org/learn/braillebasic.pdf (Accessed: 21 June 2022).

'Connecticut Assistive Technology Guidelines' (no date), p. 243.

Edyburn, D.L. (2009) 'Research and Practice', *Journal of Special Education Technology*, 24(1), p. 4.

Ford-Lanza, A. (2018) *10 Tools for a Sensory Informed Classroom*, *Harkla*. Available at: https://harkla.co/blogs/special-needs/sensory-tools-school (Accessed: 27 June 2022).

Foxwell, A. (2022) *Assistive Technology in Education: A Teacher's Guide*, *ReadSpeaker*. Available at: https://www.readspeaker.com/blog/assistive-technology-in-education/ (Accessed: 21 June 2022).

Maza, L. (2022) *10 Assistive Technology Tools That Can Help You Teach Online*, *Enabling Devices*. Available at: https://enablingdevices.com/blog/assistive-technology-tools-help-teach-online/ (Accessed: 21 June 2022).

S, Srinath. and Ravikumar, C.N. (2014) 'Braille Document Image Mosaicing: A Novel Approach', *International Journal of Computer Applications*, 103(6), pp. 32–36. Available at: https://doi.org/10.5120/18081-8906.

Stanberry, K. and Raskind, M.H. (no date) *Assistive Technology for Kids with Learning Disabilities: An Overview | LD OnLine*, *LD Online*. Available at: https://www.ldonline.org/ld-topics/assistive-technology/assistive-technology-kids-learning-disabilities-overview (Accessed: 28 June 2022).

Talking Calculators (no date). Available at: https://askjan.org/solutions/Talking-Calculators.cfm (Accessed: 23 June 2022).

What Is Braille? (no date) *The American Foundation for the Blind*. Available at: https://www.afb.org/blindness-and-low-vision/braille/what-braille (Accessed: 21 June 2022).