Assistive technology

for learners with severe to profound intellectual disability

A TEDI short guide

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Teacher Empowerment for Disability Inclusion (TEDI) is a project of the Disability Studies Division of the University of Cape Town (UCT) in partnership with the Christoffel-Blindenmission (CBM), and is co-funded by the European Union and CBM.

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Foreword

The Teacher Empowerment for Disability Inclusion (TEDI) project aims to empower teachers and carers to provide quality education for children with severe to profound sensory or intellectual impairments (SPSII) through training that is focused on inclusivity, diversity and addressing learners' disability specific needs.

In 2018, TEDI piloted its first professional development courses and workshops for carers, teachers and other facilitators of learners with severe to profound intellectual disability (SPID). Through these initiatives it became clear that there is a great need for the development of useful and practical resources for participants to enrich and further their learning on inclusive education. This short guide is one example of a response to this need.

This short guide is aimed at teachers, facilitators, carers, community workers and programme implementers working and interacting with children with SPID. It responds to the need for these practitioners to understand more about assistive technology (AT), enable them to identify the need for technology, and assist with the selection of appropriate devices. Guidelines are provided on how technology can be used to support teaching and learning across the curriculum. This short guide adopts a practical, skills-based approach and is aligned with the Department of Basic Education's policy framework and learning programmes for learners with SPID.

The purpose of this short guide is to:

- Provide basic knowledge on AT devices for children with SPID.
- Highlight things to consider when teachers and facilitators select and use AT for learners with SPID.
- Enhance teachers', facilitators' and carers' knowledge on AT for children with SPID.
- Illustrate how learners with SPID can engage with the draft national school curriculum for learners with SPID, aided by appropriate AT devices.

- Supplement readers' learning through accredited, short online and contact courses on inclusive education by providing additional information on suitable AT for learners with SPID.
- Promote a collaborative approach to teaching and caring for learners with SPID.

This short guide can be read in conjunction with TEDI's 'Educating and caring for children with profound intellectual disability' manual, and the free online course 'Severe to Profound Intellectual Disability: Circles of Care and Education' available through Coursera: https://www.coursera.org/learn/intellectual-disability-care-education

Acronyms

AAC Augmentative and Alternative Communication

ADL Activities of Daily Living

AT Assistive Technology

DBE Department of Basic Education

ICT Information and Communication Technology

ISP Individual Support Plan

LTSM Learning and Teaching Support Materials

SPID Severe to Profound Intellectual Disability

SPSII Severe to Profound Sensory and Intellectual Impairment

UDL Universal Design for Learning

Section 1

SECTION 1

Defining assistive technology

In this introductory section, we define the term 'assistive technology' (AT) and look at things to consider when identifying the need for and forms of AT for learners with SPID. We also look at the classification of AT devices from no-tech to high-tech, and how this classification affects their application and use.

After reading this section, you will be able to:

- Define the term 'assistive technology'.
- Understand the classification of AT devices from no-tech to high-tech.
- Give some examples of AT.
- Understand the need for matching AT devices carefully to individual learners.
- Identify some of the AT recommendations made by the Department of Basic Education (DBE).

1.1 Introduction

The recommendations and considerations presented in this short guide come from observations, findings and guidelines from multiple research efforts, projects and sources. The starting point for determining the AT needs of learners with SPID derived from the prescribed learning activities in the DBE's draft National Curriculum Statement Grades R–9 for learners with SPID (DBE, 2016). This comprises three subject areas – Communication and Language, Mathematics, and Life Skills – which are to be taught in an integrated manner with a learner's daily schedule in order to maximise their learning potential. The use of AT is vital for optimal learning to take place, and to enable learners with SPID to develop fully and engage meaningfully with their environment.

It is important to note that this short guide does not list all known technologies, and will need to be updated as needs and technologies change and develop. Rather, this short guide acts as a point of reference for teachers and carers to support teaching and learning using technology to enrich the experience of learners with SPID.

1.2 What is AT?

Technology is about how we use different types of knowledge and tools to carry out a variety of practical functions. We use technology all the time, ranging from simple low-tech tools such as pencils to high-tech devices such as cell phones and computers. Technology is growing in sophistication all the time and reflected in its use in schools and their classrooms. It presents great opportunities for the enrichment of learning if there is the right match according to the needs of learners, the environment, the knowledge of the teacher and the tools available (Dalton, McKenzie, et al. 2012).

Assistive technology is a device, piece of equipment or system that helps bypass, work around or remove barriers to participating in the curriculum (Reading Rockets, n.d.). AT can be used to address specific barriers to learning by enabling the learner to capitalise on strengths and bypass areas of difficulty.

1.2.1 Classification of AT devices

AT devices can be classified from no-tech to high tech according to the degree of mechanical and electronic parts they are made up of, other requirements such as a power source, and the knowledge and training the device user must have to optimise its assistance. It is always recommended that no-tech and low-tech solutions be considered before looking at mid-tech and high-tech options. Some experimentation may be required before the best learner-technology match is achieved.

Although no-tech or low-tech devices may save on costs, the main objective is to find the tools that offer learners full access to the school curriculum and ensure they are able to meaningfully engage in teaching and learning activities.

This short guide does not focus on no-tech or low-tech solutions, but acknowledges that they can help learners with disabilities gain access to the curriculum. Rather, we look more closely at the mid-tech and high-tech solutions available to learners and their teachers.

Table 1: Classification of AT devices

Type	Description
No-tech	No-tech solutions make use of procedures, services and existing conditions in the environment, and do not involve the use of special devices or equipment. Examples include pencil grips; coloured paper; extra time for testing; and the use of a scribe, reader or interpreter (Roy, 2003; Weiland, 2003, cited in Martinez-Marrero and Estrada-Hernandez, 2008).
Low-tech	Low-tech devices are simple devices that have few mechanical parts and do not require a power source. They include adapted spoon handles, adapted pens, canes, non-tipping drinking cups, magnifying glasses, and eyeglasses. Limited or less training is needed to use these devices compared to mid-tech and high-tech devices.
Mid-tech	Mid-tech devices are relatively complicated mechanical devices that may require a power source, but do not contain sophisticated electronic systems. These devices include manual wheelchairs, talking calculators, adapted keyboards, and trackballs. The operation of mid-tech devices requires some training and technical knowledge.
High-tech	High-tech devices are often computer-based systems that incorporate sophisticated electronics. They are complicated to use and require extensive training, technical knowledge, and access to technical support. With their sophisticated electronics, high-tech devices are often much more expensive than other technologies. Examples include speech recognition software, eye gaze-controlled computers, closed captioning televisions, power wheelchairs, and environmental control units.

1.2.2 AT devices recommended by the DBE

The DBE's 'Draft National Guidelines for Resourcing an Inclusive Education System – Annexure A' (DBE, 2018) details, among other important aspects of inclusive education, examples of learning technologies recommended for learners with SPSII. The standardised provision of AT to learners throughout

South Africa would ensure they have access to appropriate educationally enriching information and communication technology (ICT). Assistive technology devices that are suitable for learners with SPID are listed in the appendix to this short guide.

Section 2

SECTION 2

Selecting AT devices

In this section, we look at challenges to the effective use of AT devices by learners with SPID and their families and teachers. We outline some of the things to consider when selecting appropriate AT devices for learners with SPID, and basic learning and teaching support materials (LTSM) requirements. The different categories of AT available for learners with SPID are highlighted, as well as examples of mid-tech and high-tech devices.

After reading this section, you will be able to:

- Discuss some of the challenges facing teachers and learners in the effective use of AT.
- List criteria to consider in the selection of suitable AT devices for learners with SPID.
- Identify the types of AT devices that are most suitable for learners with SPID.
- List examples of mid-tech and high-tech AT devices for learners with SPID.

2.1 Challenges to the effective use of AT

Access to AT by children with disabilities, and their families, is a difficulty experienced worldwide. Equipment may be costly and there is a lack of funding for the provision of AT. Devices might be expensive and need to be insured against risks such as theft or accidental damage. Apart from these factors, there is little information available about AT for persons with disabilities. Teacher education on how to support learners with SPSII, and ongoing support for learners and their families, is problematic. There are often no clear procedures set out for teachers and parents to learn how and who can get access to AT devices, which devices are available and suitable, and how to get funding or payment options for their provision (Alper and Raharinirina, 2006).

A further challenge is the environment in which AT devices are used and the level of knowledge required to use them. Even when AT devices are available, they may not be used; for example, the device might not fit the learner or suit the family's needs, or require maintenance that the family cannot provide. In some instances, the device might be too complex for the learning and home environment without additional support. It is important that suitable AT devices are matched to individual learners.

2.2 Choosing suitable AT devices for learners who are blind or have low vision

Learners with SPID will have vastly different needs depending on the type and extent of their disability. What works well for one learner might not work well for another. The AT chosen for learners with SPID should reflect their specific needs and abilities, and the activities they need to do to be fully included in the prescribed learning programme. It should form part of each learner's individual support plan (ISP).

AT for learners with SPID should include instructional materials in appropriate media to enable learners to communicate effectively, and enhance social competence and personal independence. AT would, therefore, need to allow learners with SPID to learn through alternate media, using their senses and alternate modes of learning.

Before choosing AT for learners with SPID, keep in mind that they may have multiple sensory and physical disabilities, are likely to have difficulties with

communicating, and may require extensive assistance with activities of daily living (ADL). They will need graded content delivered at a slower pace and with frequent repetition to learn successfully. AT can enhance their capabilities in any or all of these areas. The following factors are important to consider when selecting AT for learners with SPID:

- **Universal Design for Learning (UDL) principles**

  The UDL philosophy or framework is defined more fully in Section 3. However, its principles of representation, expression and engagement, will inform the selection of AT devices. AT devices should:

  - present information and enable the acquisition of information and knowledge in different ways (*representation*);
  - differentiate the ways in which learners can express what they know (*expression*); and
  - allow learners to deepen their engagement and interest in the world around them through an array of learning activities that are accessible to learners with different abilities (*engagement*).

- **Learning programme/curriculum requirements**

  Different subjects require different types of engagement. AT devices should empower learners to engage in activities across the learning programme.

- **Family involvement and support**

  Family involvement in the selection and use of AT is often neglected, despite it being important for children to generalise skills at home as part of their overall development. Without the support of families, there is a risk of AT devices being abandoned. Be mindful that many parents want to be active partners in supporting their child's learning, and will feel disrespected if they are not consulted when making these choices (Alper and Raharinirina, 2006). Where learners are based at hostels, the hostel staff function as family and need to be involved.

- **Socio-economic conditions of the learner's school and home environment**

  If AT devices cannot be utilised to their full potential due to a lack of knowledge or facilities at a school or place of care, they will not be used properly and, therefore, not achieve their goal. It is important to choose devices that will be used in school and at home.

2.2.1 Main types and examples of AT for learners with SPID

There are different types of AT that learners with SPID may use to increase their independence and participation in teaching and learning activities. Some AT devices assist with a range of processes that could complement or replace speech for learners with complex communication needs. While AT can compensate for learners' skill deficits or areas of disability, this does not exclude learners from receiving remedial instruction. For example, a learner might use a calculator for mathematics, but still learn how to do calculations. AT contributes to the development of a child's self-reliance and sense of independence. Rather than being overly dependent on parents, siblings and friends, they can experience success while working independently.

Learners with SPID often have multiple disabilities. AT can be used not only to enhance their learning, but also to improve their ADL and, therefore, their independence. These are some of the areas learners with SPID may use AT:

- Aids for daily living/self-help in activities such as eating, bathing, cooking, dressing, toileting, and home maintenance.
- Augmentative and alternative communication (AAC) strategies or devices that provide a means of expressive and receptive communication for those with limited speech output.
- Computer applications, input and output devices, alternative access aids (touchscreens, mouth sticks, light pointers), modified or alternative keyboards, switches, special software, and other devices that enable persons with disabilities to use a computer.
- Seating and positioning adaptations to a wheelchair or other seating system to provide greater body stability.
- Vision/hearing aids for learners who are visually or hearing impaired.
- Wheelchair/mobility aids, manual and electric wheelchairs.

Table 2 outlines impairments that can affect learners with SPID, and gives examples of suitable AT devices that may assist them.

Table 2: Impairments and supportive AT devices for learners with SPID

Category	Description of condition	Examples of suitable AT devices
Neurological and neurodevelopmental impairments	Cerebral palsy, autism spectrum disorder, foetal alcohol spectrum disorder, traumatic head injury, stroke, epilepsy, attention and hyperactivity disorder, dyslexia, Down syndrome, dyscalculia, dysgraphia	› Literacy software for reading and writing support › Mathematics development software › Text-to-speech devices › Sensory development resources
Cognition and learning impairments	Moderate, severe and profound intellectual impairments	› Mouse skills software › Keyboard skills software › Literacy and numeracy development software › Mind-mapping software
Communication impairment	Little or no functional speech	› Portable voice amplifier › Message recordable devices › Picture symbol software › Text-to-speech devices
Learners who are D/deaf or hard of hearing, and/or blind or have low vision	D/deaf or hard of hearing Blind or partially sighted	› For blind: Braille technology; low-tech and mid-tech devices for tactile learners; non-optical low vision devices and video magnifiers › For D/deaf: Frequency modulation systems; induction loop system; personal sound amplification device; remote interpreting › See other TEDI short guides for more details of recommended devices

Table 3 lists some examples of mid- and high-tech AT devices for learners with SPID.

Table 3: Examples of mid- and high-tech AT devices for learners with SPID

Mid-tech AT devices	Function
Alternative large-print keyboard	High-contrast large-print keyboard.
Colour-coded mouse	Mouse alternative with colour-coded buttons.
Mouse-skills software	Software that includes activities to practice clicking, double clicking, drag and drop, and other mouse skills. These can be customised to suit the user's needs.
Single-message recordable device	A device that allows playback of one message or a sequence of separately recorded messages.
Multi-message recordable device	A device that allows playback of several recorded messages at various levels.
Noise-cancelling headphones	Noise-cancelling headphones can help to block out background noise for children who are sensitive to sound. They may find it helpful to connect their headphones to a white noise app that plays sounds like rain or static. If children need to listen to audio, they can listen through the headphones to help filter out distracting background noises.
Sensory development resources	A selection of developmental resources to stimulate: › Vision (e.g. glowing and light-up products) › Touch (e.g. objects with a variety of textures) › Auditory (e.g. bells, musical instruments) › Olfactory/smell (e.g. essential oils, objects that have an aroma).
Talking calculator	Calculator with audio feedback.

→

High-tech AT devices	Function
Literacy development software	Literacy development and curriculum delivery software that caters for a variety of barriers to learning.
Communication software	Communication software can be installed on a non-dedicated hardware device. It can generate synthesised or recorded speech by selecting words or symbols on the screen.
Dynamic communication device	Specialised portable device with pre-installed communication software. It can generate synthesised or recorded speech by selecting words or symbols on the screen.
Specialised e-reader	Accessible mobile electronic device that is designed primarily for the purpose of reading digital publications such as e-books and periodicals.
Mind-mapping software	Idea capture software that assists users to plan, research, outline, study and present information.
Picture-symbol software	Electronic picture-symbol libraries on a CD, USB stick or online. They enable the creation of paper-based overlays for speech-generating devices, communication boards, books, and symbol-based materials for learning and classroom management support.
Proximity switch	A device that replaces a computer keyboard or a mouse. It can also be used with a communication device and software, switch-adapted toy, switch interface for computer access, sensory room equipment, and environmental control device. It is designed to meet the needs of individuals with limited movement, strength and/or endurance.
Multimedia player	Portable multimedia player, e-book reader and optional voice recorder.

High-tech AT devices	Function
Keyboard skills software	Software to develop keyboard skills. This includes typing tutor programs to teach keyboard layout, develop touch typing skills, and improve spelling and other keyboard skills. It can be customised to suit the user's needs.
Literacy, numeracy, science, creativity curriculum activities software	Software to develop literacy, numeracy, science or creativity skills. There are multiple software titles with fun and engaging activities.
Simulation software for math, science, technology, computing, automotive skills	Simulation software to develop different skills.
Inclusive interactive music system	Interactive music system that can be accessed in various ways to promote inclusion.
Text-to-speech handheld scanner	Portable handheld device that reads English text aloud when scanned over print, to promote independent reading.

Mid- and high-tech devices for learners who are D/deaf or hard of hearing and/or blind or have low vision are listed in other TEDI short guides.

Section 3

SECTION 3

Using AT devices

This section includes information about how a teacher or facilitator can use AT devices within their learning programme to assist learners with SPID. We define and explain the purpose and principles of UDL in relation to the use of AT, and highlight its influence on the effective use of AT devices. We then look at the effective implementation of AT within a learning programme, and illustrate the importance of using the correct AT devices to achieve specific learning outcomes for particular learning areas or subjects.

After reading this section, you will be able to:

- Define UDL and explain its principles.
- Describe how UDL principles affect the choice of AT devices.
- Outline things that need to be taken into consideration when using AT devices effectively within a learning programme.
- Give examples of mid- and high-tech AT devices that help learners with SPID to reach specific learning outcomes.

3.1 Universal Design for Learning (UDL)

UDL is a research-based framework or approach to teaching and learning that helps to make education accessible to all learners. It is based on the notion that the needs of all learners should be accommodated during the design, implementation and teaching of learning stages and activities. It promotes a set of principles for curriculum development that gives all learners equal opportunities to learn (Sadao and Robinson, 2010).

UDL principles can be adopted to ensure that AT devices are chosen and used in a way that best suits individual learners. They encourage flexible ways of using devices, which are customised and adjusted for individual needs, and do not subscribe to a one-size-fits-all approach. The ultimate purpose of UDL is to increase access to learning for all learners by removing barriers that impede involvement and engagement

3.1.1 Principles of UDL

In Section 2, UDL principles were applied to the selection of suitable AT devices for learners with SPID. We will now look more broadly at how UDL principles could be applied to the use of AT.

The three overarching principles of UDL that should guide curriculum design, the selection and planning of teaching and learning activities, and the selection of AT for the classroom and individual learners, are:

- **Representation:** Giving learners various ways of acquiring information and knowledge. This means that information and content is presented in different ways, and that different methods of teaching and reaching learning goals are used.
- **Expression:** Differentiating the ways that learners can express what they know. This means that learners are allowed to communicate what they know through various modes of expression, and can demonstrate their proficiency or mastery of a skill through a variety of means.
- **Engagement:** Stimulating interest and motivation for learning using content that is suitable for the varied levels of abilities and preferences/ interests of learners. This is achieved by facilitating options and choices of activities and resources.

Table 4 indicates the AT devices that can be used to practically apply the UDL principles while teaching learners with SPID.

Table 4: AT devices for learners with SPID that enable the practice of UDL principles

UDL principle	AT devices
Representation	**High-tech**
Enabling multiple ways of presenting content	› Literacy development software › Specialised e-reader › Picture-symbol software
Expression	**Mid-tech**
Enabling learners to communicate what they know and can do through various means	› Alternative large-key keyboard › Colour-coded mouse › Mouse-skills software › Talking calculator
	High-tech
	› Multimedia player › Literacy, numeracy, science, creativity curriculum activities software › Simulation software for math, science, technology, computing, automotive skills › Inclusive interactive music system
Engagement	**High-tech**
Enabling the facilitation of choices of learning activities to cater for the varied abilities of learners	› Screen reading software › Literacy, numeracy, science, creativity curriculum activities software › Mind-mapping software › Simulation software for math, science, technology, computing, automotive skills › Inclusive interactive music system

3.2 AT devices within a learning programme

Every school subject has different types of knowledge and skills that learners need to acquire. Different AT devices will be required depending on the types of teaching and learning activities planned for achieving the learning outcomes of the subjects or learning areas making up a learning programme.

In this short guide, the DBE's Draft Learning Programme for Children with SPID (DBE, 2016) is used to illustrate how AT devices could be used to achieve specific learning outcomes for learners with SPID. Table 5 indicates the AT devices that are recommended by the DBE for each learning area. Further specifications can be found in the Appendix.

Table 5: DBE-recommended AT devices for specific learning outcomes

Specific learning outcomes	Recommended AT devices
Communication and Language	
Listening and receptive skills	› Amplification through a variety of hearing aids systems › Picture-symbol software
Expressive skills	› Single-message recordable device › Multi-message recordable device › Picture-symbol software › Dynamic communication device › Communication software
Pre-literacy skills	› Text-to-speech handheld scanner › Colour-coded mouse › Mouse-skills software › Keyboard-skills software › Literacy, numeracy, science, creativity curriculum activities software

Topics/skills Specific learning outcomes	Recommended AT devices Recommended AT devices
Mathematics	
Numbers, operations and relationships; Patterns, functions and algebra; Space and shape (geometry); Measurement; Data handling	› Literacy, numeracy, science, creativity curriculum activities software › Simulation software for math, science, technology, computing, automotive skills › Talking calculator
Life Skills	
Personal and social well-being	› Sensory development resources › Noise-cancelling headphones
Creative arts	› Adapted grips for paintbrushes, pens, etc. › Adapted slanted boards or adjusted tables and chairs for positioning
Physical education awareness	› Exercise and physical fitness can be supported by video-based technology › Proximity switch › Toys can be adapted with switches and other technologies to facilitate play. Computer or video games provide age-appropriate social opportunities, and help children to learn cognitive and eye-hand co-ordination skills. › Specially designed Internet-access software can help people with intellectual disabilities access the World Wide Web.

3.2.1 Implementing AT in the classroom

After selecting the most suitable AT device(s) to reach specific learning outcomes, there are other aspects that need to be considered when using AT as part of a learner's ISP.

The following aspects of AT use and inclusive education need to be considered for successful, sustainable AT implementation (Alper and Raharinirina, 2006):

1. The AT devices need to fit with the learner's family's goals and values for their child's learning.
2. The AT devices need to be fully integrated into the learner's learning programme (i.e. they are not used when 'thought of' or as 'an add-on', but are incorporated in the planning of teaching and learning activities).
3. Family members, teachers, facilitators, support professionals and the learner work collaboratively to experiment with and use various AT devices, in order to reach learning outcomes for the learner optimally.
4. Communication among the aforementioned people is ongoing.
5. AT devices and accompanying equipment are maintained, replaced or modified as needed.
6. Problems experienced with the use of AT devices are resolved as quickly as possible.

While the focus of this short guide has been on the selection and use of AT devices for learners with SPID, it is important to note that the categories of AT for different types of disabilities are not mutually exclusive and can co-exist. Learners with SPID often have multiple conditions, which result in multiple impairments and disabilities (e.g. a child with Down syndrome may also have visual or hearing impairments). It is recommended that teachers, facilitators and carers of learners with any type of disability, become familiar with AT devices that can be used to assist learners with other types of sensory and intellectual disabilities.

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Appendix

APPENDIX

This Appendix presents the devices recommended in the DBE's 'Draft National Guidelines for Resourcing an Inclusive Education System – Annexure A' (2018) for learners with:

- neurological and neurodevelopmental impairments;
- cognition and learning impairments (moderate to profound); and
- communication impairments (little or no functional speech).

The DBE's draft national guidelines document offers more AT device recommendations for a broad range of disabilities, some of which may also assist learners with SPID. It is therefore advised that you not only read the other TEDI short guides on AT devices, but also refer to the guidelines published by the DBE.

Devices to assist learners with neurological and neurodevelopmental impairments

Product Type	Functional Description	General Specifications
Literacy Software for Reading and Writing Support	Software that assists learners with reading and writing difficulties.	• Visual enhancements • Audio and visual feedback when reading text • Support for reading, writing, study and research • Can be used with any documents and web pages • Read accessible and inaccessible PDF files • Include word prediction and dictionary • Ability to create audio file from text

Product Type	Functional Description	General Specifications
Maths Development Software	Software that supports the learning needs of users struggling with Maths.	› Activities include lesson plans, computer-based activities, number games, printable worksheets, reward certificates › Optional assessment tool to identify areas of difficulty and suggest remedial action › Can be run online or offline
Text-to-Speech Handheld Scanner	Portable handheld device that reads English text aloud when scanned over print to promote independent reading.	› Hear words and lines of text read aloud › Dictionary feature › Scan directly to a document on a computer › Access previously scanned documents on the device
Sensory Development Resources	A selection of developmental resources to stimulate vision, touch, auditory skills, sense of smell.	› Vision: examples include glowing and light-up products › Touch: examples include objects with a variety of textures › Auditory: examples include bells, musical instruments, etc. › Olfactory (smell): examples include essential oils and objects which have an aroma

Devices to assist learners with cognition and learning impairments (moderate to profound)

Product Type	Functional Description	General Specifications
Colour-coded Mouse	Mouse alternative with colour-coded buttons.	› Small, fits easily into a child's hand › Coloured left and right buttons to distinguish between left click and right click › Scroll wheel › USB connection
Mouse Skills Software	Software to develop mouse skills.	› Activities to practice mouse clicking, double clicking, drag and drop, and other mouse skills › Can be customised to suit the user's needs
Keyboard Skills Software	Software to develop keyboard skills.	› Typing tutor programs to teach the keyboard layout, develop touch typing skills, improve spelling and other keyboard skills › Can be customised to suit the user's needs
Literacy, Numeracy, Science, Creativity Curriculum Activities Software	Software to develop literacy, numeracy, science or creativity skills.	› Multiple software titles with fun and engaging activities › Speech support and clear visuals › Feedback provided in the form of animation and music when questions are answered correctly › Switch accessible (where applicable) › Performance reporting tools (where applicable)

Product Type	Functional Description	General Specifications
Simulation Software for Maths, Science, Technology, Computing, Automotive Skills	Simulation software to develop different skills.	› Variety of themes including: • Maths: experiment with mathematical models • Science: create and conduct a range of experiments in a virtual science lab • Technology: teach systems and control • Computing: teach computer control and programming • Automotive: teach and learn automotive skills › Lessons with instructions › Create own simulations › Performance reporting tools (where applicable)
Literacy Development Software	Literacy development and curriculum delivery software that caters for a variety of barriers to learning.	› Write using words, pre-set phrases and/or pictures › Intelligent word predictor and spell checker › Accessibility features such as text-to-speech output, screen magnification, colour contrast, switch, mouse emulation, eye gaze, etc. › Compatible with Windows or Mac
Mind-Mapping Software	Mind-mapping and idea capture software titles.	› Assist users to plan, research, outline, study and present information › Capture ideas, photos, notes, web page links, audio and video files › Support for touchscreen or interactive whiteboard
Inclusive Interactive Music System	Interactive accessible music system that can be accessed in a variety of ways to promote inclusion.	› Make music and sounds via methods such as touch, movement, switch or eye gaze › Compatible with Windows, Mac or iOS

Devices to assist learners with communication impairments

Product Type	Functional Description	General Specifications
Portable Voice Amplifier	Wearable voice amplifier.	› Worn by the user to amplify their existing voice › Microphone options include: lapel, headset, transdermal (worn around the throat) › Rechargeable battery and charger
Single-Message Recordable Device	Device that allows playback of one message or a sequence of separate recorded messages.	› Record and playback voice, music or sound effects › Recording played back on activation of a button › Different length of recording times available › Built-in microphone and speaker › Button can be labelled › Optional storage of a sequence of messages per button › Optional version with two buttons that allows the recording of two separate messages › Battery-operated
Multi-Message Recordable Device	Device that allows playback of several different recorded messages on various levels.	› Record and playback voice, music and sound effects › Recording played back on activation of a button › Different length of recording times available › Built-in microphone and speaker › Buttons/pages can be labelled › Optional scanning feature activated by separate switch › Battery-operated

Product Type	Functional Description	General Specifications
Picture-Symbol Software	Electronic picture-symbol libraries on a CD, USB stick or online.	› Enable the creation of paper-based overlays for speech generating devices as well as communication boards, books and symbol-based materials for learning and classroom management support › Can be printed on paper or used directly on the computer screen › Optional additional symbol libraries available e.g. sign language or social skills
Dedicated Text-to-Speech Device	Device that allows typed text to be converted to synthesised speech.	› Built-in keyboard › Screen to display typed text › Synthetic voice output of the typed message › Mounting or wearable options available › Optional keyguard › Rechargeable battery and charger
Dynamic Communication Device	Specialised portable device with pre-installed communication software.	› Generate synthesised or recorded speech by selecting words or symbols on the screen › Customisable interface › Compatible with various access methods e.g. touch, switch, eye gaze › Optional features: e-mail, internet, text messages, environmental control › Mounting or wearable options available

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Product Type	Functional Description	General Specifications
Communication Software	Communication software that can be installed on a non-dedicated hardware device.	› Generate synthesised or recorded speech by selecting words or symbols on the screen › Customisable interface › Available resources include: • Text-based interface • Symbol-based interface • Interactive learning games and activities • Online community of downloadable resources › Compatible with various access methods e.g. touch, switch, eye gaze › Optional features: e-mail, internet, text messages, environmental control
Synthesised Voices	Additional text-to-speech voices for use with assistive technology.	› Compatible with other products e.g. communication and screen-reading software › Available South African voices: SA English, Afrikaans, isiZulu, isiXhosa, Sepedi

TEACHER EMPOWERMENT FOR DISABILITY INCLUSION

The Teacher Empowerment for Disability Inclusion (TEDI) project aims to empower teachers and carers to provide quality education for children with severe to profound sensory or intellectual impairments through training that is focused on inclusivity, diversity and addressing learners' disability-specific needs.

This short guide is aimed at teachers, facilitators, carers, community workers and programme implementers working and interacting with children with severe to profound intellectual disability. It responds to the need for these practitioners to understand more about assistive technology, enable them to identify the need for technology, and assist with the selection of appropriate devices. Guidelines are provided on how technology can be used to support teaching and learning across the curriculum. This short guide adopts a practical, skills-based approach and is aligned with the Department of Basic Education's policy framework and learning programmes for learners with severe to profound intellectual disability.

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