The role of the Occupational Therapist with children with low vision

By Clare Hubbard

Part 2: The role of the occupational therapist (OT) in the multidisciplinary team with focus on adaptation of materials for learning and exam accommodations.

Introduction

The role of the occupational therapist (OT) in the rehabilitation/habilitation of children with low vision, encompasses many aspects. In the first article (Part 1, Vol.2 Focus August 2022), the role of the OT was outlined in relation to classroom accommodations and extra-curricular activities, as well as capacitation of the educators to ensure the low vision principles are implemented as part of inclusive teaching practice. An individual approach to classroom and assessment accommodations for learners with visual impairment relies on understanding the unique presentations of each learner in relation to their visual condition and function viz. visual acuity, loss of central or peripheral vision, visual field, light sensitivity and stereopsis (depth perception). The OT serves as a valuable bridge between the health, social and education sectors and assists in the interpretation of the clinical findings of vision specialists into practical accommodations for the learner.

It is well-documented that the principal barrier faced by visually impaired children is access to information and learning from an early age. This article focuses on enabling learners with visual impairment to access learning and teaching materials in the school setting. The impact of visual impairment on early scholastic skill, especially reading, is presented in the context of promotion of adapted reading materials in foundation phase education. It is critical that the educator applies low vision principles and provides a variety of adapted materials to avoid developmental and learning delays. Guidelines for internationally accepted print adaptations will also be outlined as well as accommodations for tests and examinations.

Contemporary pedagogical practices for visually impaired learners acknowledge the importance of teaching skills for "access to learning" as well as "learning to access" through technology. The systemic problems of poor digital literacy and ITC support and internal resistance to change from educators and schools is described briefly. The use of assistive devices in accessing print materials and accommodations in the classroom will be outlined in the third article (Part 3).

Visual Impairment in children – definitions and epidemiology

Persons with visual impairment have unique clinical presentations across the visual functions assessed by an Ophthalmologist, Optometrist/Low Vision Specialist, including visual acuity, visual fields, depth perception, colour vision, contrast sensitivity and cortical visual functions. Commonly the World Health Organisation definition of visual impairment is used to outline the large range of visual impairment and how to classify a person as partially sighted (low vision) (WHO, 2021).

Figure1: WHO definition of Visual Impairment (2021)

Category	Worse than:	Equal to/better than:
Mild or no visual impairment 0		6/18 3/10 (0.3) 20/70
Moderate visual impairment 1	6/18 3/10 (0.3) 20/70	6/60 1/10 (0.1) 20/200
Severe visual impairment 2	6/60 1/10 (0.1) 20/200	3/60 1/20 (0.05) 20/400
Blindness 3	3/60 1/20 (0.05) 20/400	1/60* 1/50 (0.02) 5/300 (20/1200)
Blindness 4	1/60 *or counts fingers (CF) at 1 metre 1/50 (0.02) 5/300 (20/1200)	Light perception
Blindness 5		No light perception

Values are Snellen meters (Snellen feet) and [LogMAR].
CF, count fingers.

"A person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception, or a visual field of less than 10 degree from the point of fixation, but who uses, or is potentially able to use, vision for planning and/or execution of a task."

The Role of the OT providing services to children with visual impairment

The OT forms part of a team with health, education and social care professionals viz. Ophthalmic nurse, Ophthalmologist and Optometrist, as well as Educator, Social Worker, Braille technician, ICT technician and Orientation and Mobility Practitioner, in both public or private sectors. For effective education of children with low vision, a multidisciplinary team approach needs to be used, including being part of the school-based Support Team (SBST). This is mandated by the Screening, Identification, Assessment and Support Policy (2104). The SBST meets regularly to develop individual support plans (ISP) for learners with barriers to learning.

Occupational therapy interventions for children with low-vision, focus on promoting motor, language, emotional, social and cognitive development and promotion of positive self-concept (Augestad, 2017). The therapist uses rehabilitative/ adaptive strategies to maximise visual function and visual efficiency skills, taking into consideration the specific and individualised accommodations necessary for a child to fully engage in their daily occupations at home, at school, in the playground and in their community.

The OT works closely with the Optometrist to address functional limitations in the occupational areas of a child's life in both near- and far-distance vision tasks. This includes recommendations for size of print required and/or strength of magnification required to allow the child full access to learning and teaching in the classroom.

Initial OT interventions may focus on improving visual efficiency skills viz. using eccentric vision optimally, working left to right, reading labels of drawings first to direct visual attention, using specialist stationery etc., for carryover into the classroom. However, even when utilising visual efficiency strategies with appropriate, adapted/enlarged materials, the learner uses a lot of effort to access print materials and may need ongoing therapeutic and educational support in the classroom.

The visual nature of learning and implications for reading and print performance

It is asserted that 80% of all learning takes place through the visual system from a very young age. In comparison with sighted peers, children with visual impairment have limited opportunities to fully access learning through incidental experiences in their environment. However, the most significant barrier to learning is poor access to adapted printed and visual materials for learning (McCall, 1999).

Children with undetected refractive error (eyesight or visual acuity problems which can be corrected through spectacles), underperform in emergent literacy skills, including letter and word recognition, receptive vocabulary, and orthography (use of letters in words) (Shankar, Evans & Bobier, 2007) and reading skills (Dudovitz et al., 2016). It is not surprising, therefore, that partially sighted children tend to have poorer print performance (reading, spelling and comprehension), than their sighted peers. The most common reading accuracy errors are "substitution errors" in young visually impaired learners.

From Grade R, emergent literacy skills including phonological awareness, shared reading and exposure to environmental print are pivotal foundations for later literacy skills. Kao and Mzimela (2019) argue that it is imperative that teachers understand a learner's visual impairment while adapting and modifying the learning context.

Foundation Phase educators are required to test learners' reading ability to identify delays or difficulties in accuracy, speed and comprehension of reading. The Department of Basic Education's strategic plan to improve the reading scores of primary school learners advocates the use of the Early Grade Reading Assessment (EGRA) (Grove & Wetterberg, 2011), which is available in a large- print version in several official languages. Some provinces have utilised the EGRA on an Information and Communication Technology (ICT) based multi-media programme, with reading material accessible to learners on a tablet which can be magnified. School remedial educators and psychologists may utilise low-vision versions of low vision tests.

Visually impaired children will almost always require additional time for visual learning tasks. The international standard for additional time as part of reasonable accommodation, is up to 50% additional time per hour and is applicable to classwork, school-based assessment and examinations (see Assessment Accommodations). Poor educational performance in learners with visual impairment is largely because of poor availability of high-quality adapted visual materials in schools (Douglas et al., 2009).

Providing access to adapted learning and teaching support materials (LTSM)

Support and capacitation of teachers for classroom accommodations and ensuring access to adapted LTSM for learners with high-level needs is critical, as part of specialised educational support (DBE, 2014 b). The impact of Section 27s Left in the Dark report (Fish-Hodgson & Khumalo, 2015) and the subsequent litigation against the Department of Basic Education in South Africa is significant for learners with visual impairment. The legal ruling indicates that every learner with visual impairment in any ordinary public school, must be provided accessible LTSM through school budgets in the adapted format most suited to the learner.

In terms of professional accountability, the OT needs to promote the rights of the learner to access adapted visual learning activities requiring print/visual text including play materials, specialised stationery, pre-literacy resources including drawing, reading, numeracy, writing, fine motor activities, artwork and visual modalities of teaching, such as film or video. Effective teamwork and commitment to inclusive practice is critical to achieve optimal development and learning for visually impaired learners, in both mainstream and Special Schools.

The visual nature of the curriculum and right to adapted materials.

A criticism of the South African Curriculum Assessment Policy Statement (CAPS) is that the curriculum is "too visual" in content, with the use of many diagrams, pictures and in-text references to diagrams and pictures in many subjects including Mathematics, Maths Literacy, Sciences, Business Statistics, Economics, Geography and History (Fish-Hodgson & Khumalo, 2015, p.66).

Most learners with visual impairment utilise the CAPS curriculum and complete the National Senior Certificate (NSC) (Grade 12) examinations. The educator must ensure that the adaptation of the learning material (a task or assessment) addresses core learning objectives and assesses the same concepts as the non-adapted task. This requires exceptional subject content knowledge and collaboration with a Special School for VI learners or other stakeholders.

It is imperative that schools provide accessible learning texts and materials to support emergent literacy acquisition, early conceptual development, vocabulary building, literacy and numeracy skills.

Schools are mandated to provide large-print versions of readers, textbooks, workbooks and setwork books to VI learners. Other organisations can assist with large-print books and story books for class libraries e.g., Na'libali. Tactile books and audiobooks are necessary in early childhood education to ensure young children with low vision have similar access to pre-reading materials in the official South African languages (https://www.salb.org.za/our-services).

Specialised support from a Special School as Resource Centre

The types of support that a SBST can expect from a Special School as Resource Centre (SSRC) (specialist educators and assistive technology/Braille technicians employed at Special Schools), or from low-vision specialists from private or non-governmental organisations are:

- teach mainstream educators minimum standards for developing adapted print materials and assessments/ examinations.
- SSRC should assist with production or printing of learning materials from master (electronic) copies in large print or audio format (textbooks, workbooks, setwork books etc.).
- share/loan large print readers/books, and tactile books for younger learners.
- share and distribute common and provincial assessments and examinations in enlarged, adapted format to identified learners in mainstream schools.
- Provide assessment and loan of low-vision assistive devices/technology.

Guidelines to Schools for adapting print-based learning and teaching materials

The Guidelines for Responding to Learner Diversity in the Classroom through curriculum and assessment policy statements (DBE, 2011), serve as guiding documents for SBSTs and educators. Also refer to other key resources viz. MS03 UKAAT (Evans & Blenkhorn, 2004) and Windows accessibility guidelines. (https://support.microsoft.com/en-us/windows/guide-for-people-who-are-blind-or-low-vision-11c8b979-f8cd-f65e-6406-6f03b613b94b).

These resources provide internationally accepted guidelines to educators and team members involved in preparing adapted, accessible and enlarged learning and assessment materials e.g., Braille technicians in Special Schools and ITC technicians in all schools.

Key guidelines :

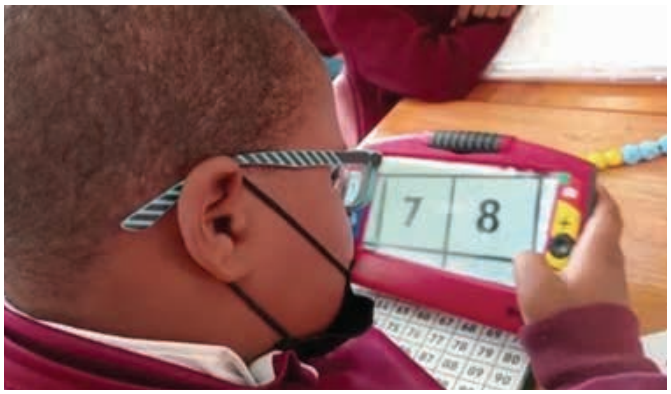
- Schools to provide hardcopy printed learning materials in the correct size of font to ensure the learner can read this with optimal correction (wearing spectacles) (neardistance work - font size of 18, 24 or 36) depending on logMAR (magnification or enlargedprint size) recommendations:
  - Educator to provide typed notes to learner in advance of the lesson (produced in Word for Windows format);
- Providing the optimal Sans Serif type of fonts are internationally promoted, which are easier to read e.g. Arial, Comic Sans, Helvetica etc. but not in bold;
- Yellow (or any other pastel colour) or transparent filter may be trialled in terms of improving visual function for a learner;
- The print should not be bolded, or underlined and the use of CAPITALS for headings and red print should be avoided;
- The layout of documents (produced in Word - Windows 10 or Office 365) should use the standard formatting, with use of headings, subheadings and numbering using the formatting tool;
- The use of document headings is essential to enable rapid and effective navigation, skim reading and searching;
- The standard Accessibility Checker for Word and PowerPoint is critical to use with learners who are visually impaired :
  - All diagrams, pictures and graphs should be labled with educationally relevant descriptions using Alternative Text (Alt Text); this enables the learner to read the label before attempting to interpret the picture and is compatible with screen reader software;
  - All diagrams, pictures, graphs and maps should offer the best contrast possible, with colour adjustments (black on white; light colours on dark);
  - All diagrams, pictures, graphs and maps should be simplified where possible so as not to detract from the key learning points; line diagrams are preferred to shaded diagrams;
  - Adapt/reduce visual clutter in visual materials i.e., remove non-essential details that the learner can easily scan the essential printed information.
- For keys, scales and legends used in subjects such as Geography, Economic Management Science, Physical Science, Technology and Tourism, a separate enlarged sheet may be necessary as those provided in printed workbooks are often visually cluttered and have reduced/ standard font size.
- Where colour coding/interpretation and 3-D visual perception is critical in subjects e.g., Tourism and Geography, and for orthophoto and relief maps, the printing quality and contrast needs to be optimal and enlargement must not lead to distortion of visual material;
- Learners who present with colour vision deficiencies need to be accommodated e.g., in Geography the six colour elements, signs and symbols need to be taught very explicitly, which are best provided as an enlarged printed supplementary learning chart.
- Print size needs to be adjusted for task, font style, difficulty of reading task, and personal preferences of the learner.

Other adaptations for printed teaching and learning materials in the classroom

Distance visual learning material: - Wall-hung posters and charts need to follow the same principles e.g., enlarged, bold font (up to 48 or 56 for distance vision of 12 feet), removal of visual clutter and use of high contrast.

Blackboard and whiteboard use: - Write in large letters in print rather than cursive writing; - Allow learner to approach the board whenever necessary; - Clean blackboards and whiteboards properly, as these teaching surfaces notoriously offer poor contrast. - Use only white or yellow chalk blackboards; - Use black or dark blue pens on whiteboards; - Red pen/ink should be avoided in all visual materials; - Educators should provide rich descriptions or read aloud everything that is written on the board.

Individualised learning materials: - Provide individualised learning materials e.g., name and number strips produced in more accessible font type and size viz. Arial, Comic Sans, Helvetica (or Teacher's Pet in Foundation Phase) in appropriate size for each child; - Consider providing reading strips, number strips and number bond charts in Foundation Phase; - Matt lamination reduces glare.



Foundation Phase learner using adapted materials in the classroom i.e. electronic magnifier.

Assistive technology and use of electronic format to provide access to learning materials

Learners are increasingly using technology such as electronic magnifiers, computers, laptops and tablets, to access print material in electronic format and with use of assistive technology and software the learner can access enlarged adapted print without relying on others (parent/teachers/peers) to provide the material for them (Douglas et al., 2009).

When provided ahead of time, technology allows the learner to follow the lesson on a tablet or laptop in real-time to enhance learning. Electronic texts/materials can be provided in the following ways:

- Educator provides lesson notes to learner in advance in Word or pdf format (on a USB, email or cloud-based sharing methods);
- The school provides the learner with all electronic format textbooks, workbooks and setwork books in advance (downloaded onto computer/device) so as to allow the learner to access material in the classroom.

The use of a dedicated computer or laptop with screen magnification software is preferable for learners with moderate to severe visual impairment, as the standard accessibility features of a computer operating system may be inadequate in terms of magnification/zoom function, enlarged icons and font and other accessibility features. The advantage of specialised magnification software is that there is no distortion or pixelation of visual information on magnification or zoom functions.

There is evidence to support the use tablets and laptops for visually impaired learners from a young age to aid pre-literacy, emergent and advanced literacy and numeracy development and for access to a full range of texts/printed learning materials (Toledo et al, 2010). However, the success of technology with these learners is reliant on the explicit teaching of touch-typing (with or without a high visibility keyboard) and teaching educational/computer assistive technology (CAT) skills (McLinden et al., 2106).

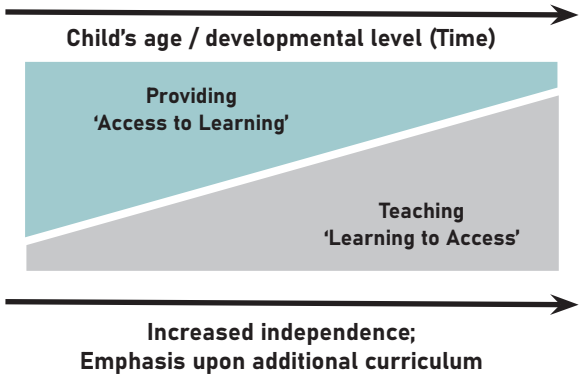


Figure 2: Access to learning and learning to access for children with visual impairment - adapted by McLinden et al., 2016

https://www.spevi.net/wp-content/uploads/2020/04/McLinden-Douglas-What-Matters-What-Works.pdf

Persistent poor inclusive practice for adapting materials for VI learners

1. Enlarging through photocopying A4 size to A3 size scripts

The practice of enlarging a standard worksheet or test from an A4 to A3 size on a printer or photocopier is a common example of poor inclusive practice in this field. If a standard worksheet is only enlarged and not adapted it is unlikely to meet low vision principles e.g., specified text size, good contrast, use of Alt Text for all pictures/graphs and visual decluttering.

Common problems when photocopying to enlarge texts, rather than customised adaptation according to minimum standards are:

- Poor clarity and visual distortion with photocopied enlargement is common.
- Photocopying done on both sides results in show-through or bleeding if the paper quality is poor;
- Photocopied maps and tables often lack clarity and contrast;
- The younger child will find an A3 size page cumbersome to work with at the desk;

Ideally worksheets/tests are being prepared for the visually impaired learner (in Word for Windows), and this is done for A4 page printing in the correct size print and font

style, ensuring low vision principles are applied, including adaptation of questions where needed. Correct layout and spacing is important.

Tips when to use screen reader software in preference to enlarged size font or magnification

Enlarged printed material with font size larger than 36 pts (MAG 4X) or 44 pts (MAG 5 X) is considered too large for regular printed material in the classroom, even with a magnifier.

Alternatives such as provision of a laptop and screen magnification software may be preferable.

The best print quality (sharp, clean) printing is preferable rather than photocopying from a printed original. If an A4 copy is enlarged to A3 then this should be done at 135% on best quality print. Printing should be printed on one side using a heavier gram matt paper.

Where possible an approved large-print (or electronic format) textbook, workbook, setwork book and readers should be provided rather than photocopying of standard print books as these are unlikely to meet low-vision principles.

Adaptation of questions is often necessary e.g.; a visually impaired learner should not be asked to draw a picture or graph in a test/exam. It is necessary for the educator to devise an alternative question by referring to the memorandum and setting a question that demands the same content knowledge without simplifying the content or altering the difficulty.

Tips for Layout of worksheets/tests in Word for Windows

- After enlarging the font to the desired font size, do a final edit of an A4 document paying attention to the visual ease of reading. The order of test questions may need to be altered. Rather start a question on a new page so it is visually clear. Remember to adjust spacing to 1.5.
- Remove "visual clutter" such as page borders and boxes.
- Ensure tables with columns and "matching activities" are presented on one page (consider Landscape View).
- Select or substitute a picture with the best quality picture possible (cartoons/diagrams etc.) to ensure maximal contrast. Enlarge pictures without distortion. Line diagrams are preferred, rather than shaded.
- Insert page numbers, preferably at the bottom of the page using the format page 3 of 6…. Enlarge the page numbers to required size. At the end of a test paper use the word END.
- Be on the lookout for 'smaller' letters and numbers such as exponents and symbols such as degrees as these may be too small for learners to read and should be enlarged.

2. Continued use of the blackboard for teaching of VI learners

Most learners with low vision find it impossible to read off the blackboard and therefore to take notes/copy from the blackboard during the lesson. Blackboards provide very poor contrast and good distance vision is required. To compensate for this, a VI learner may copy from another learner sitting next to them or borrow a learners' book to copy the work at home (at close distance), which creates additional homework for the learner. In some cases, the learner will try to memorise what was taught in class, which burdens the auditory memory modality.

Use of auditory learning strategies predominantly may be effective in primary school but is no longer effective in secondary school when the content and volume of work increases. In the worst-case scenario, the learner will disengage from attempting to take notes and from learning altogether, and the risk for school drop-out is high. It is preferable for a VI learner to receive enlarged printed lesson notes or an electronic copy for use on a computer in advance of a lesson.

3. Reluctance to embrace assistive technology in the classroom

In the long-term developmental view, there is support for embracing technology in education. Computers and assistive technology have become ubiquitous in the education of visually impaired learners in many countries (McLinden et al., 2016). Computers and assistive technology enable learners with visual impairment full access to all learning materials and gives learners a measure of independence. Corn et al. (2002) study found that young children who used a computer and assistive technology had increased silent reading speeds and comprehension rates. Douglas, Coraran and Pavey, (2007) research revealed that adults with visual impairment who use assistive technology and have digital skills are more likely to be in employment.

The delivery of school-based ICT services to learners across special and mainstream schools in South Africa is an ongoing challenge due to lack of digital literacy of educators and ITC based support for training, ensuring hardware, software and peripherals are in working order (Padayachee, 2017). The identified challenges include lack of staff employed to provide dedicated ICT support and lack of provision of computers/ laptops for individual learners. Some schools have safety and security risks and concerns about the durability/damage of learner laptops. This increases the reluctance to move away from provision of hardcopy enlarged print materials/books as the standard practice, even in Special Schools for VI learners. To ensure success, provision of electronic materials must be paired with teaching of educational technology skills.

Assessment accommodations for learners who are partially-sighted

Learners who are partially-sighted will require adaptation of content, adaptation of the format of the assessment (enlargement), as well as assistive technology to demonstrate their academic abilities under standard examination conditions and on an equal basis with their sighted peers (DBE, 2014 a). Learners with colour blindness or visual fatigue may also need individualised assessment accommodations. Where learners have been prescribed spectacles for refractive errors and/or visual acuity deficits, these must be used in assessment and examinations.

Identifying, applying and implementing the most appropriate assessment accommodations such as adapted printed or electronic test/exam papers, is a relatively simple process if these are regularly utilised in the classroom. Policy dictates that the school must apply for assessment

accommodations for learners with barriers to learning, with a recent Medical Report completed by an Optometrist or Ophthalmologist (on Form DBE126: Health & Disability Assessment) and evidence of support/accommodations in the classroom. The type of accommodation requested to best support the learner is determined and discussed with the learners' parent/ guardian. Schools should apply for exam accommodations at the beginning of a phase/band as the awarded accommodation is valid for that phase.

Adaptation of questions in assessments and examinations refers to the modification of questions to accommodate the learners visual impairment, but which examine the same subject content e.g., substituting visual images or graphs with text descriptions, and the selection of pictures and visual media in question papers meet contrast and accessibility standards, for learners who are partially sighted. All NSC (Grade 12) adapted papers must be adapted by examiners working in collaboration with experts in specialised education for learners with visual impairment.

Learners who are partially-sighted are eligible for additional time for all subjects i.e., maximum 30 minutes per hour. In exceptional circumstances, the application for a reader and/or scribe may be necessary for a learner with visual impairment, for instance in sudden traumatic visual loss (emergency/ad hoc application) or where a learners' visual function deteriorates, and the learner has not learned an alternative method to access the curriculum (audio/ Braille) and to produce a script on a computer.

Conclusion

The prime barrier faced by learners with mild to severe visual impairment is the limited or restricted access to adapted and/ or enlarged visual information and learning materials in the classroom. Educators, despite their clear understanding of inclusive education practices, have difficulty in applying the internationally accepted minimum standards for adaptation of materials and providing access to accessible learning materials in the classroom for visually impaired learners. In all South African schools, learning to adapt learning materials and to incorporate assistive technology for inclusive practice, requires commitment from SBSTs and school management (Engelbrecht et al., 2015).

The adaptation of teaching and learning materials according to international standards is mandatory and includes the use of enlarged materials, simplified and enhanced diagrams, increased contrast and colour adjustments, good quality photocopying/ printing together with use of low-vision devices, electronic materials and assistive technology in the classroom. These practices all form part of specialised educational and therapeutic support for learners to succeed in their development and education, and to exit the basic education system with increased chance of employability.

The OT has a pivotal role to play as part of the health, social and education team in assisting educators, Braille technicians and ICT technicians to understand the functional implications of the learners' visual impairment and to teach the learner to optimise their visual function.

The last part (Part 3) of this series (Focus Vol.1, April 2023), will highlight the role of the OT in the identification, prescribing and trialling of the most appropriate assistive device/s and technology for the learner with low vision in the classroom.

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Submission of FOCUS articles for 2023

OFFICIAL NEWSLETTER OF OTASA

There will be three issues of the Focus for 2023 that will be published at the end of April, the end of August and mid-December.

Submission dates for these issues:

- **20th February**
- **19th June**
- **9th November**

Photos, graphs, logos, flyers and other information related to the articles must be attached in as large a size (high resolution) as possible. Some links to websites may be activated in the final version of each issue that gets loaded onto the OTASA website.

The Focus is your space to share any OT-related or relevant input with other OTASA members, be they in public, private, academic or community practice. Members include all OTs, OTA/Ts, (working, retired or even overseas), as well as students and corporates.

Input includes news, views, reviews, achievements, tributes, research and so much more – but it depends on what you, the members, submit or request. Please send any submissions in Word, via email to Sylvia at focus@otasa.org.za anytime before the submission dates for each issue.

Focus is the place where members can be informed about the work being planned or done by the OTASA committees and groups, which includes important aspects related to the profession as a whole.

The Focus provides, authors, reviewers and readers the opportunity to get free CPD points from writing articles that are longer and include elements of research and accredited references, or from answering MCQs from these articles.

Looking forward to loads of input to create bumper issues for 2023!

Please send any submissions in Word via email to Sylvia at focus@otasa.org.za