

Reimagining an Augmentative Communication: An Inclusive Curriculum Angle

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KEYWORDS Augmentative and Alternative Communication. Sign Language. Braille. Real-time Text. Diverse Learning Needs. Inclusive Educational Intervention

ABSTRACT This study draws examples from practices implemented in the South African National Department of Basic Education in providing for the needs of all learners. This is in line with the requirements for inclusive educational intervention underpinned by Education White Paper Number 6 of 2001, which explores inclusive education. The paper reminds the teacher, the curriculum developer and the examination authority, to consider making adaptations, which are necessary for the learner to derive optimum benefit from learning tasks and assessment procedures. Using the information from the qualitative research conducted, this paper explores Augmentative and Alternative Communication practices in the curriculum for disabled learners. The paper describes adaptations done to texts meant for use by learners in these groups. Findings indicate the need for comprehensive teacher training, teacher empowerment, and adequate production of appropriate means of communication for a diverse spectrum of learners.

1. INTRODUCTION

This paper is guided by four main questions:

1. To what extent is the Department of Education involved in augmentative and alternative Communication (AAC) matters?
2. Do educators who have learners with diverse needs have adequate training to address those needs?
3. Is augmentative and alternative Communication (AAC) meeting the diverse needs of learners?
4. Which augmentative and alternative Communication (AAC) practices are in place in South Africa?

Pro-inclusion changes in education in the last two decades impel teachers to assume facilitator roles and require them, and other role-players in the education value chain – including those who are part of the curriculum development unit – to improve communication with learners. The importance of effective communication becomes a focal point today, when the net value of national talent has to be tapped out of every citizen – a process which entails clear understanding of intra individual and shared meanings. The authors used the qualitative research method with its strategies and techniques to capture the views of all experts consulted.

Semi-structured interviews were used to capture views from the Department of Augmentative and Alternative Communication (AAC) at the University of Pretoria and experts from the Disabled Student's Units.

Further, the paper informs practitioners on innovations meant to improve access to educational text and related learning materials. The paper is targeted at a wide audience comprising researchers, service providers, families and individuals with visual and hearing impairment. It is an attempt to encourage service departments and other legal persons involved in education to cater for the needs of all types of learners with disabilities from the first grade to higher and further education and training. The paper takes an elaborate approach to AAC, which includes learners and other people with conditions that inhibit speech – such as cerebral palsy, apraxia, autism, aphasia, traumatic brain injury and multiple disabilities (Bornman 2005:171) – and other groups of learners, on aspects where their traditional means of communication do not offer adequate clarity for optimum task accomplishment. The term is also applied to certain aspects of media adaptation for learners with hearing and visual impairment.

AAC is very important in today's classroom, where the teacher is accountable to the learner

for the learning interactions he/she initiates. It is a scenario where the learner is equally accountable to the teacher for the feedback he/she gives back to the teacher. In such a teaching/learning context, a strong reciprocal relationship should be formed, which is bound by collaboration and deepened by intense communication. This means, all media applied to the learning context should be appropriate to the specific needs of learners who use them, including test and examination tasks set for the learner. The relationship between a teacher and a learner is centrally hinged on effective and efficient communication. The teacher avails the curriculum to the learner such that the learner should be able to access it fully. If the components of the curriculum are not presented in an accessible form, then the teaching-learning encounter becomes counter-productive and futile as learners would not benefit optimally from the learning process.

2. REVIEW OF RELATED LITERATURE

Traditional literature confines the application of AAC to measures taken to aid the communication of learners and other people with conditions that inhibit speech – such as cerebral palsy, apraxia, autism, aphasia, traumatic brain injury and multiple disabilities (Bornman 2005:171). This paper departs from the traditional view on the basis that communication among the blind and the deaf is not wholly comprehensive merely by the fact that they use media such as Braille and sign language. The author views the twin process of ‘augmenting the means to obtain lucid meaning’ and ‘setting alternatives’ in certain aspects of communication for the deaf and the blind. The volume of technological improvements to communication for both the blind and the deaf testify to the need to augment existing communication channels for the two groups. More research is also being done to improve meaning, even for the deaf-blind. For the blind, for example, pictures and some diagrammatic presentations are meaningless. Most information should be presented as text to facilitate recognition and translation into speech.

The Braille Authority of North America (2010) states that: ‘Some complex diagrams will never provide meaningful tactile information.’ Because of this reason, they recommend that a decision be made on how to communicate con-

cepts more clearly to the reader. They suggest some of the following; a well-stated transcribers’ note, a tactile graphic, a simplified tactile graphic with a transcriber’s note, or a three-dimensional model. Tiresias.org (2011) adds that such accommodations are not only for the blind; but for other people who experience problems with ‘seeing, recognising or deciphering non-text information presentations’ as well. A person who adapts reading materials should consider all aspects of the adaptations. Kitchel (2012) details several considerations that should be applied by teacher’s transcribers and other relevant personnel in education. Discretion and common sense are improved as more tasks of adaptation are done.

2.1 Enhancing the Learner’s Retention of Braille Graphics

While adaptation is important, learner preparedness for understanding the adaptations is critical. When adapting learning materials, the needs of learners should be considered, and learners who have the necessary interpretation skills to benefit from one form of adaptation or another, should be fostered. Learners with visual impairment should therefore be equipped with certain skills that will equip them to use various adaptations effectively. The University of Utah (School of Medicine) 2011, suggests tips for learners who rely heavily on tactile means for learning. The University of Utah suggests that learners should be encouraged to use models, skim through embossed texts to get a rough idea of what they are about, before looking for details and writing notes in summary of what they would have read. Other techniques include the reduction of information learners would have read, using main ideas and key words. They also propose tracing patterns and making clay models to gain more holistic mental images of different phenomena. So, the learner should be actively engaged in the learning process in order for techniques to be instilled.

However, the process of exploring tactile materials has improved over time. There are various different technologies available to assist people with visual impairments. These include tactile image enhancers which use firm Flexi-Paper. There is also a Thermo pen that is used to write raised graphics on Flexi-Paper. Some manufacturers have now achieved mak-

ing Flexi-Paper tactile drawings that will not get distorted even when crumpled. There is also Technical Graphics Design software available (Windows 2011: Tactile Graphics and Braille Graphics). The requirement to keep texts clear for those with visual impairment is still observed because the technology mentioned is capable of producing distinctly clear drawings. There is an opportunity for tactile graphics in the education of people with visual impairment; however mentally 'taxing' it might be to the unfamiliar. The learner should therefore be introduced to graphic representation, three-dimensional figures, and the use of other forms of diagrams, when he/she first learns Braille (The Braille Authority of North America 2010).

2.2 Adaptation of Text to Suit the Deaf Learner

A typical definition of AAC would not include the deaf learner since they rely fully on sign language (Bornman 2005:172). However, considering the close relationship between writing, reading and talking, there is a need for adapting text to make it more understandable to the deaf. To clarify contexts and meanings, sign language sketches could be added to written text. With the advent of DVD technology, print text could be recorded on a DVD with an insert of a sign language interpreter, who could clarify complicated text descriptions. The purpose of communication is to share meaning and establish a common understanding of issues at hand. Twinning text with sign language would thus be an aid to clarity, serving the same purpose as subtitling or captioning (Wikipedia 2011). It is not aimed at causing a distraction. In the case of subtitling, the text could be in the same language that is being spoken on the programme being viewed. It helps the deaf and the hearing impaired to follow the conversation (Wikipedia 2011). More improvements are being made on standard captioning. More special symbols are being introduced, without Latin letters. There is also a possibility for viewers to adjust the size of the caption text on their television sets. This range of improvements is compliant to specifications set by CEA-708, according to Information Healthcare.com (2011). Further, implementation of the EIA Standard for Digital Television has shown that innovations made to date have eliminated most of the prob-

lems which were associated with closed captioning (Wikipedia 2011).

Although not necessarily used by the National Department of Education for adaptation purposes, new advances in communication technology are now permitting the use of Real-Time Text technology by the deaf and persons with hearing impediments. According to the definition offered by the Real-Time Text Taskforce (2011), Real-Time Text is 'conversational text that is sent and received on a character by character basis. The characters are sent immediately (in a fraction of a second) once typed and also displayed immediately to the receiving person(s)'. Some classroom practitioners could consider conversing with their learners actively using Real-Time Text from time to time, as it could allow people with speech and hearing limitations to use emergency services as well (Real-Time Text Taskforce 2011).

For those who cannot use conventional speech-based classroom interactions to participate in the learning process, it is important to understand AAC as a communication bridge set to enable them to participate in the learning process through receiving and passing information in ways they can understand. This paper aims to demystify the meaning of AAC for learners who are blind and deaf, so that it equally permits activities undertaken to adapt their materials to suit their perceptual modalities best. Limitations still prevail in the education of these two groups of learners by exclusive conventional use of Braille and sign language. If their communication needs are not well-understood and addressed, they too will not be able to 'speak to' or access the texts made available to them for learning. Some adaptations which improve the communicative quality of learning materials would still be regarded as part of AAC initiatives, since they are aids to communication for groups of learners whose communication needs are normally taken for granted and largely overlooked. Another aim of this paper is to explore and highlight the need to enable such learners to offer their feedback to teachers using means that they can understand and articulate best.

3. METHODOLOGY

The author used the qualitative research method with its strategies and techniques.

Data collection instruments used In-depth interviews. The group of interviews consisted of the following:

- Department of Augmentative and Alternative Communication at the University of Pretoria
- Participants from DSUs from the University of Johannesburg, University of Free State, University of the Witwatersrand and Stellenbosch University
- An ex-principal of a school for the blind
- An English Language Specialist-cum author.

Each group of interviewees was engaged separately and each interview lasted 40 to 50 minutes. Semi-structured interviews were employed to gather the views of interviewees. Five (5) experts from the Department of Augmentative and Alternative Communication at the University of Pretoria, ten (10) participants from disabled students' units (DSUs), one (1) English language specialist who is also an independent writer, and one (1) former principal of a school for the blind in Pretoria were interviewed. These interviewees were part of the task team that was adapting books for learners without speech, learners with visual impairment, and deaf learners. Their inputs centred on a means of communication for learners who cannot speak, adaptations for the deaf, and adaptations of text for learners with visual impairment. Inputs on adaptations of text for learners with visual impairment were sourced specifically from one former principal of a school for the blind, who is also a writer and materials developer. The author of this paper added to the information he received from the last source using his expert knowledge in the education of people with visual impairment. Practical developments, such as complaints from student bodies on the unavailability of text materials, indirectly informed by the low capacity of Braille Printing Houses in meeting the needs of at least learners using Braille, was also used.

3.1 Ethical Considerations

Informed consent was sought from individuals involved as respondents through verbal consent. The researcher followed and maintained ethical procedures to protect participants involved in the study against any form of violation of human rights, free wills, integrity, con-

fidentiality and beneficence. The option to refuse to participate was well-explained. Consent was sought from individual study participants on their own volition, in accordance with the principles of social research ethics and human rights. In addition, a separate room was secured and used for interviews at the venue in order to grant personal privacy and comfort during the interview process. Participants felt comfortable with the designated place of interview and did not choose alternative venues or rooms for interview purposes. Local customs, institutional cultures and values were respected during the conduct of the study. Arrangement was made beforehand to ensure that the outcome of this study would be made known to all parties involved in AAC in South Africa.

4. RESULTS AND DISCUSSION

The findings of this paper are aimed at sharing perspectives on ways of improving disabled learners' access to educational information through considering their limitations in the use of information when it is presented in ways typical for learners without disabilities. The results and discussions are headed by the questions which the researcher sought to answer through the research effort.

□ *To what extent is the department of Education involved in AAC matters?*

The extent to which the National Department of Basic Education is involved in AAC is inferred through activities which the department is involved in. The South African National Department of Basic Education provides learners' workbooks, facilitator guides and other learning media in forms which are suitable for the diverse learning needs of adults who participate in its Kha Ri Gude Mass Literacy Campaign. The department provides a number of adaptations to print texts meant for use in a typical regular classroom. Such adaptations vary in nature and in response to the communication needs of learners with different impairments. There could be similar adaptations for learners at primary and secondary school level, but there are sometimes reports that teachers find many parts of examination papers which need to be adapted for learners with sensory and other impairments. The department is cognisant of the need to represent the communication needs of learners in classrooms across the country, yet

lack technical know-how to manage the process of adapting test/examination papers. The adaptations are meant to eliminate, or at least ameliorate, the barriers imposed on learners due to the lack of necessary accommodation. Some of the most important adaptations are discussed below.

□ *Do educators who have learners with diverse needs have adequate training to address those needs?*

There is little official evidence to suggest that South African teachers are not well-trained to cater for the learning needs of all their learners. There are, however, various examples of such deficits, which are evidenced by teachers at various meetings and workshops – from pre-school to Grade 12. There could also still be feelings of inadequacy expressed by higher level academics in accommodating the communication needs of higher education students. It is necessary to highlight the range of adaptations which could be made for learners with different needs. The following six subheadings are meant to contextualise the discussion in terms of both national and international attempts at meeting the communication needs of learners in the different subgroups mentioned. Knowledge systems which are available at national level, and readers of this paper, particularly in South Africa, will appreciate how much has been achieved and fathom how deep they have to cast their energies in order to effect positive change in the accommodation of the learners with special needs in the country. An appreciation of what is available on the market and the efforts being made by other people is helpful in the determination of what people could do to improve their situation.

□ *Is AAC meeting the diverse needs of learners?*

In the writer's opinion, the matter under discussion here is neither just about the unitary efforts of the Department of Education, nor is it about singular initiatives of any other body, to address the shortages which are apparent in this paper. The key issue involves examining the capacity of the aggregate of different printing houses and other stakeholders to meet the needs of learners with more communication needs than those of typical learners for whom hand-tailored learning material abound. Perhaps evidence has to be displayed on the bigger picture of what could collectively be achieved by the combined efforts of all significant stakeholders.

Facts about the availability of media for the mitigation of learning encounters for all learners in need of AAC abound at global level. The problem is that there is an uneven availability of such resources across countries. South Africa is not an exception in this regard. There are sporadic demonstrations by learners in examination classes in schools for the blind (particularly), whose main grievance is always about a lack of important/ prescribed textbooks, or a delay in the delivery of such textbooks in accessible format, or a lack of capacity on the part of printing and publishing houses. Inadequate provisions of textbooks and workbooks for Braille users are prominent, and teachers in this sector complain about the late receipt of Learner-Teacher Support Materials (LTSMs), or that some assessments related to that sector are not done on time. These expressions of dissatisfaction are indications that either the production or the distribution of requisite learning materials is inadequate. Experiences shared by interviewees used in this research touched on the relatively long time that it takes to produce a quality textbook in Braille, taking into consideration the usual waiting period of one year that many who place orders to printing houses bear. It is recommended that the Department of Education should consider the difference it would make if it established a national Braille Printing Press. The department has to consider the needs of all other learners with unique communication needs and make big initiatives to bridge their problems.

□ *Which AAC practices are in place in South Africa?*

The answers solicited by this question are aimed at sharing perspectives on ways of improving disabled learners' access to educational information. There was no answer that itemised all research used in different schools to mitigate the learning encounter for all learners with needs for AAC. To varying degrees, innovations outlined in answer to the second research question are applied by different learning institutions in differing degrees. The question that needs to be addressed is the availability of resources for the procurement of requisite materials. It is also apparent that most centres of higher learning that trained teachers offered courses for the mitigation of learning encounters for learners with little or no speech, at the detriment of learners outside that bracket.

4.1 Adaptation of texts to suit learners who are blind

Learners who are blind can benefit from reading their learning materials in Braille. It is the quality of the learning material that has to be adapted to suit the experiential repertoire of the blind learner. Most classroom texts are written for a typically sighted learner. The texts contain expressions which have little or no relevance to a learner who is blind. Many descriptions are based on visual content, while little thought is given to those learners who are visually impaired or have no vision, to imagine the content of tasks given to them. A guideline on considerations could be drawn up using several examples that curriculum developers should bear in mind. Drawings of animals, people, cartoons and other pictures are basically disorderly dots to the blind; there is nothing in them which makes them look like the animals or other things they represent in a print picture. They are difficult to understand; therefore should be avoided in Braille texts. Graphs, histograms and bar charts can be understood by learners who are blind but it takes many years of schooling to be competent in reading them. There is a need to include only essential features so as to keep the graphs simple and without clutter.

The wording in various texts written for the blind should be reviewed with a questioning mind. A question that asks learners to draw a cow or other objects is not relevant for blind learners. Curriculum developers should such tasks or questions so that they are accessible and manageable for a competent blind learner. An alternative task should be presented at the same level of difficulty as the one it replaces, and it should test for skills on the same concept. Questions requiring learners to 'circle the correct option' or to do other things which require the use of a pen are not suitable for blind learners. They should be rephrased and ask learners to 'copy the letter that corresponds to the right answer' or do such other action instead. A person who adapts reading materials for the blind should possess good common sense and engage his/her mind actively on the task of adaptation. It should be noted, for example, that as much information as possible should be available, in text, to facilitate recognition and translation into speech both for the blind and for other people who experience problems with 'seeing, re-

cognising or deciphering non-text information presentations" (Tiresias.org: Guidelines for Large Print, Clause 8.7.1).

4.2 Challenges

Matters regarding adaptation are never exhaustively dealt with. It is almost impossible to adapt text well enough to satisfy all learners because they are unique individuals, for example, two learners might both have tunnel vision, but their area of useful remaining vision might differ. So, one person might need a book to be printed in a large print format since a magnifying glass is adequate in itself, while the other might lament the unavailability of the former. Some forms of adaptation might be perceived as an underestimation of the intelligence of persons with visual impairment, while the person who adapts the material would be working in good faith. There is no single solution to the issue of adaptation, but it should be made with the best consideration of a well-founded practitioner for it to represent the midline. Adaptation is therefore not a solution which works equally effectively for all intended readers, but a general solution to increase text comprehensibility.

4.3 Enhancing the learner's retention of Braille graphics

To adapt learning materials successfully, the needs of learners who can benefit from a form of adaptation crafted for him or her need to be considered. Thus, the basic requirements that learners with visual impairment have, should be addressed when doing adaptations effectively. The University of Utah (School of Medicine) 2011, suggests tips for learners who rely heavily on tactile means for learning. A few of them, which learners will encounter during their learning experiences, will be outlined below. Schools could use these to prepare learners for the effective use of tactile graphics or Braille graphics (Braille.com 2011).

In order to internalise skill in the use of the sense of touch, certain personal practices should be cultured in individual learners. Firstly, all learning should be hands-on, meaning that the learner should engage with learning materials at a physical rather than theoretical level as much as possible. The learner should touch and

manipulate his/her learning material rather than just being told about the material that they will explore. Activities such as assembling jigsaw puzzles enable learners to imagine shapes and contours. This leads to the development of better mastery of ideas about laterality, linearity and holism, applicable to the understanding of some aspects of technical graphics. A hands-on approach to learning also means that raised diagrams should frequently be used in the learner's reading materials. This ensures abundant practice in the use of relevant graphics, thereby reducing the fear of non-verbal representations of concepts, commonly associated with blind learners' perception of certain topics in Mathematics and Physical Sciences. More importantly, learners should develop their imagination up to a point where they can readily apply it in a practical presentation. They should also be able to engage their minds quickly in order to see patterns in raised diagrams or other figures used in an examination or a class exercise.

Beyond investing interpretive skills in learners, their interest in working regularly with different materials commonly regarded as technical graphics should be adequately developed. This discussion points to the need for intensive physical activity in learning, coupled with trying to understand how to do things from those who have mastered a skill and have gained automaticity. The final result of all these efforts at improving the quality of the learner as a reader is to ensure that interpretation of non-picture tactile information is made with relative ease. The achievement of that level of interpretive skill in a learner is evidenced by the amount of time the learner puts into self-initiated, rigorous diagram interpretation. Learners should be encouraged to use models, skim through embossed texts to get a rough idea of what they are about before looking for details and writing notes in summary of what they would have read. Learners should be encouraged to write down what they would have learnt using summaries, key words and main ideas that lead to specific or general possible deductions. Information reduction should enable learners to make 'flashcards' of core ideas. Learners could also trace diagrams to study their pattern and explain them to others. The University Of Utah School Of Medicine (2011), suggests that for some learners it could actually help to make clay models of certain concepts. They also place memorisation,

brainstorming, and studying with a friend or group among effective methods of instilling material that has been studied in one's mind. Some studious learners were found to be fond of rewriting information that they need to remember. Coherent explanation of a concept comes with deeper understanding of the concept, pattern or other phenomenon in question.

4.4 Adaptation of text to suit learners with low vision

Learners with low vision are neither half sighted nor half blind. They are faced with problems and other circumstances which vary from one individual to another. However, there are general guidelines which are applied to the adaptation of their learning materials. The typeface size is recommended to be at least 18 point and the use serif fonts are not recommended. The x-height and t-heights should be at least 1/8 of an inch. Spacing between print lines should be at least 1.25 line spaces. Headings and sub-headings should be larger and bolder than regular large print text. Paragraphs should be in block style (no first line indentations to indicate new paragraphs), with 1 inch margins and justified only on the left margin, and not the right margin. Printed materials in columns are difficult to read, and divided words are destructing and should be avoided. Background designs should be avoided and should be plain. Use of black print on white, ivory, cream or yellow paper with a dull finish (so as to minimize or avoid glare) is recommended (Tiresias.org: Guidelines for Large Print). Plain language should be used as it reduces the confusion in complicated syntax. The purpose of writing is to communicate effectively. Graphics should be enlarged, and matters of font size, contrast, colour and other large print guidelines should be considered at all times. If illustrations are included, use either full-colour or high-quality black line art. Gray-scale shading is less conspicuous and destructing to people with low vision. There are also specifications relating to the ideal size of large print books. The book should weigh up to 32 ounces, while its dimensions should be no bigger than 12 inches (length), 9 inches (width) and 2.5 inches (thickness). Specifications relating to seating positions and lighting effects in class are part of classroom interventions. They are not adaptations to

text; therefore they fall out of the scope of this paper.

4.5 General Principles on the Adaptation of Questions and Tasks

Questions and tasks should be adapted to provide concept access to learners with visual impairment, so that they could also meet the assessment objective covered. Sometimes there is no real need to adapt a question, but in cases where a question needs to be adapted, the replacement question should assess the same skills, knowledge, attitudes or values as the one it replaces, and assess the same objectives as the original question. The adapted question should also be at the same level of difficulty, keeping the balance of the paper both in terms of content and the weighting. Adaptation should also be mindful of the average amount of time it would take to accomplish the new task. The new task should take as much time to solve as the original task. It should be cautioned though, that adaptation should not completely remove visual materials. Such removal should only be muted when the learner is not expected to have such a visual experience, or when such content does not form part of the purpose of assessment.

Tactile graphics are developed for use by learners of all ages: from pre-school to higher learning. There are already many materials on the market, which are used for the production of tactile reading materials and tactile graphics production. There are tactile image enhancers which use firm Flexi-Paper. There is also a Thermo pen which is used to write raised graphics on Flexi-Paper. Some manufacturers have now achieved making Flexi-Paper tactile drawings which will not get distorted even when crumpled; thus, materials which are drawn remain legible. There is also Technical Graphics Design software on the market (Windows 2011: Tactile Graphics and Braille Graphics). The requirement to keep texts clear to those with visual impairment is still observed because the technology mentioned above is capable of producing distinctly clear drawings. There is still a place for tactile graphics in the education of people with visual impairment; mentally 'taxing' as it might be to the unfamiliar. A few words have to be said about keeping it simple. Firstly, graphic material should preferably be developed electronically, printed on the Tiger Pro Graph-

ics Braille Embosser and contained on one Braille page. These materials could be maps, graphs or science drawings. It is most important to ensure that simplification of such maps and other materials should not remove meaning. Questions illustrated in the maps or other graphics should still be answered using the simplified version. Simplification could be the removal of things that increase clutter, such as mere decorations which become unnecessary shading, and confusing lines and textures. In certain cases it is necessary to insert a key or a subheading or a short description at the top of some graphics. It is important to be consistent in layout as inconsistencies are confusing and the reader wastes time when searching for information in an 'unstructured' document. For example, in drawn sketches, one could emboss all labels horizontally. Having some labels horizontally, others diagonally and yet others vertically, would be inconsistent.

4.6 Adaptation of Text to Suit the Deaf Learner

A strictly technical definition of AAC would not include the deaf learner since they rely fully on sign language (Bornman 2005:172). However, considering the close relationship between writing, reading and talking, one would realise the need for adapting text to make it more understandable for the deaf learner. There may be a need to add sign language sketches to written text, to clarify contexts and meanings. With the advent of DVD technology, it is even more helpful to record print text on DVD and insert the image of a sign language interpreter, who would be making additional sign language explanations to clarify complicated text descriptions. The purpose of communication is to share meaning and establish a common understanding of issues at hand. Twinning text with sign language would thus be an aid to clarity, serving the same purpose as subtitling or captioning (Wikipedia, The Free Encyclopaedia: Closed Captioning 2011). It is not an attention distracter. In the case of subtitling, the text could be in the same language that is being spoken on the programme being viewed. It helps the Deaf and those who are hard of hearing to follow the conversation (Wikipedia, The Free Encyclopaedia: Closed Captioning 2011). More improvements are being made on standard captioning. More special symbols are being introduced, without Latin let-

ters. There is also a possibility for viewers to adjust the size of the caption text on their television sets. This is called caption volume control. There are also more colours in which the captions could be seen, together with more colours for the background. There are also more text styles than the monotonous 'letters on a solid background'. There are also more text fonts available for display, complete with options for mono-space and proportional spacing. The width of the reception band has been increased to allow for more data to be channelled per minute. In addition, more independent caption streams are made possible by the introduction of more languages. The reader has a choice which allows for better understanding through the use of a language one understands better. All these efforts are made so as to reduce confusion among readers. This range of improvements is compliant to specifications set by CEA-708, according to Information Healthcare.com (2011). Further, implementation of the EIA Standard for Digital Television has shown that innovations made to date have eliminated most of the problems which were associated with closed captioning (Wikipedia 2011).

4.7 Adaptations for Learners who are Deaf-Blind

Deaf-blindness is a very low-incidence disability about which the general public is not well-informed. Learners who are deaf-blind have 'a dual disability, with the effects of one loss compounding those of the other...' (Yoken 1979:7 as cited by Maguvhe 1997:5). These learners need a mixed approach to the interventions that would enhance communication in a teaching-learning scenario. Maguvhe (1997:5) suggests four types of communication that were used by the deaf-blind learners in the United States of America. These are sign language, finger-spelling, aural/oral (auditory/speech – for those with some residual hearing), and Braille. He further noted that 'The individual's mode of preference should be taken into consideration for the facilitation and implementation of effective communication and education.' Other systems of communication were also listed and explained by Maguvhe. These included the British Two-Hand Manual Alphabet, writing, line guides, large print materials, magnifiers, closed circuit television, telecommunication devices, for the deaf, speech reading, hearing aids... In-

ternational Morse Code. Maguvhe however cautioned that the age of onset of deaf-blindness, the degree of residual hearing/sight, the etiology of hearing and/or visual impairment, language capabilities and the learner's previous experiences, were important variables to consider in the use of the different types of communication.

4.8 Adaptation of Text to Suit Learners Who Can Hear But Cannot Speak

Learners who can hear but cannot speak need AAC. Their prime input mode would be speech (Bornman 2005:179-181; Centre for AAC and Autism). These learners need to be equipped with voice output devices – of which there are quite a few on the market today, notwithstanding the cost. Where costs are prohibitive and when considerations are made about portability, manual picture boards may be considered. In general, AAC systems are classified into two groups: aided systems and unaided symbols. Voice output devices and manual picture boards are considered aided symbols. Unaided symbols make use of the body only. The National Department of Basic Education has a mandate to provide information on the access needs of learners in this category as well; and where possible, a wide variety of both aided and unaided symbols should be made available to learners at different levels in their education. Learners with hearing impairments can also benefit from the use of Real-Time Text as described above. They too should be able to enjoy the same privileges as any other learners in education.

5. CONCLUSION

A careful analysis of the above findings led to the following conclusions:

- Printing houses are overwhelmed by the volume of books they have to adapt and print, as evidenced by the waiting period between ordering a new book and having it printed. Learners' disharmony and strikes concerning availability of textbooks are an occasional, but strong testimony to that.
- Most in-service courses for teachers cover teaching methodology, not aspects which relate to the adaptation of means of communication to meet the needs of the learner as a communicator and a recipient of taught information.

- Universities which offer teacher training courses in AAC prepare them mainly for learners with little or no speech. There is little input on accommodating the blind and visually impaired, or the deaf, on aspects where they would need special accommodations to Braille, print and sign language. Thus, teachers are not adequately trained to meet the learning needs of all their learners.

6. RECOMMENDATIONS

Based on the conclusions made in this research, recommendations are drawn, which inform three possible areas: printing and publishing of Learner-Teacher Support Materials, teacher education and the staffing function of Government.

6.1 Printing and Publishing of Learner-Teacher Support Materials

Means should be put in place to increase the capacity of existing printing houses and to establish provincial (Department of Education) printing presses. If costs are prohibitive, a National Braille Press could be established to offset the current pressure experienced by existing facilities.

6.2 Teacher Education

Institutions of higher learning should design curricular which enable them to train teachers adequately to meet the learning needs of different groups of learners. Workshops for teachers should include information on how to ensure that effective communication takes place in the teaching-learning encounter.

6.3 Role of Government: Staffing

The National Department of Education could also ensure that there is enough specialist staff

to cover technical functions such as assessment in subject areas studied by learners with unique communication needs, so that their efforts would not be compromised by oversight resultant from misinformation.

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