Journal of Lexicography and Terminology, Volume 4, Number 2. Published on 15/11/2020. Pages 77 - 104. ISSN Online: 2664-0899. Print: 2517-9306

READING AND WRITING BRAILLE GRADE 2: CONCEPTUAL UNDERSTANDING AND EXPERIENCES OF GRADE 4 LEARNERS WITH VISUAL IMPAIRMENTS IN NDOLA

by

Albert Mulenga[1] and Kenneth Kapalu Muzata[2]

[1]Kwame Nkrumah University – Zambia

[2]The University of Zambia

Abstract

This paper presents findings of a study conducted to assess the conceptual understanding and experiences of grade 4 learners with visual impairments in reading and writing braille grade 2. The study was conducted in 2019 at one selected school for learners with visual impairments on the Copper belt province of Zambia. Ten (10) participants were involved on the study comprising eight (8) learners and two (2) teachers purposively selected. The objectives were to establish learners' ability to read and write braille grade 2, identify the nature of reading and writing difficulties concerning braille grade 2 and to assess the common reading and writing difficulties among grade 4 learners with visual impairment at the school. Three research instruments were used to generate qualitative data for the study. These were reading and writing assessment activities for learners, Focus Group Discussion Guide for learners and an In-Depth Interview Guide for the teachers. Data were analysed according to themes that emerged from the data but guided by the general research objectives. The findings were that some learners had the ability to read and write braille grade 2 competently while others were struggling. Failure resulted mainly from lack of early intervention, inadequate teaching and learning resources; and inadequate practice of reading and writing braille grade 2. It was recommended to teachers and the school for learners with visual impairments that they should introduce learners with blindness to braille early enough and provide intensive practice in Grade 2 Braille.

Key words: braille, challenges, reading, writing, visual impairment and contractions.

1. Introduction

Braille remains the main medium of reading and writing among persons with visual impairment. Teaching pupils with visual impairment braille is necessary for their independent functioning in daily life. For learners with visual impairment to communicate their written ideas, they need to make use of braille. Braille is the basic most literacy medium that gives them access to the same print information that is given to learners with sight. Teaching pupils with visual impairment is necessary for their independent functioning in daily life that equal their individual abilities, interests, aptitudes, personality qualities and present circumstances (Morris and Blatt, 1986). Though it is known that teachers are trained to teach pupils in schools and conduct lessons every day, teaching pupils with visual impairment constitutes a challenge for teachers (Simalalo, 2006). Pupils with visual impairment require alternative forms of teaching and learning methods. This includes the use of braille to read and write and other assistive devices that increase accessibility to education. Each pupil with visual impairment in a classroom presents his or her own set of unique experiences and learning opportunities. However, their entire learning process can be much smoother when appropriate teaching methods and assistive devices designed to enable their learning are used to meet their needs.

For learners with visual impairment, and specifically those who are blind, braille is a system of reading and writing they use to read and write. Braille was refined in the late 1800's by Louis Braille, but originally developed by a French army captain named Charles Barbieri to enable his officers to read battle commands during the night without the aid of candle light. Braille can be transcribed in any language, including the Zambian Languages. It uses codes known as braille codes. Braille code enable blind (visually impaired) and partially sighted people to read and write through touch. Braille should not be mistaken as an independent language. It is a form of reading and writing. The fact is braille is a system of reading and writing in one's own language without the use of sight for those who are totally visually impaired. The braille alphabet consists of patterns of raised dots arranged in cells of up to six dots in a 3-by-2 configuration. Each cell's dot arrangement represents

a braille letter, numeral or punctuation mark. Many frequently used words and letter combines also to have their own single-cell pattern contractions.

Braille occupies many pages in writing and usually the speed of reading and writing braille is slower. Partly because of the size that braille pages occupy, and partly to improve the speed of writing and reading, the literary braille codes for English and many other languages employ 'contractions' that substitute shorter sequences for the full spelling of commonly-occurring letter groups. In the first of the grades of Braille, grade 1, each possible arrangement of dots within a cell represents only one letter, number, punctuation sign, or special Braille composition sign. It is a one-to-one conversion. Individual cells cannot represent words or abbreviations in this grade of Braille. Because of this grade's inability to shorten words, books and other documents produced in grade 1 Braille are bulkier and larger than normally printed text. Grade 1 Braille is typically used only by new learners of the grades of Braille. At the institution where this research was done, learners from grade1 to 3 are exposed to grade1Braille. Grade 2 braille was introduced as a space-saving alternative to grade1Braille. In grade 2 Braille, a cell can represent a shortened form of a word. Many cell combinations have been created to represent common words, making this the most popular of the grades of Braille. There are part-word contractions, which often stand in for common suffixes or prefixes, and whole-word contractions, in which a single cell represents an entire commonly used word. Words may be abbreviated by using a single letter to represent the entire word, using a special symbol to precede either the first or last letter of the word while truncating the rest of the word, using a double-letter contraction such as 'bb' or 'cc', or removing most or all of the vowels in a word in order to shorten it. A complex system of styles, rules, and usage has been developed for this grade of Braille. At the institution where this research was done, learners from grades 4 to 12 are exposed to braille grade 2. In Short, at grade 4 there is a transition for learners from braille grade 1 to braille grade 2.

1.1 Statement of the Problem

Braille remains the main medium of reading and writing among persons with severe visual impairment, who cannot use sight to read text. Learners with severe visual impairment depend on braille as a way of communicating their ideas in reading and writing

what has been written. In Zambian schools and to be specific, at one of the schools of learners with visual impairment in Ndola - Copperbelt province, learners are taught grade 1 braille from grades 1 to 3. At grade 4, braille grade 2 is introduced. The conceptual understanding of braille codes and the experiences of learners in braille grade 2 at the school are not really known. This study endeavored to find out the experiences in the reading and writing of braille grade 2 by grade 4 learners with visual impairment.

1.2 Objectives of the Study

The objectives that guided the study were:

1. To establish the ability to read and write braille grade 2 competently in 4th Grade learners with visual impairment
2. To identify the nature of reading and writing difficulties concerning braille grade 2 among 4th Grade learners with visual impairment.
3. To assess the most common reading and writing difficulties experienced by 4th Grade learners with visual impairments at selected school in Ndola

1.3 Study Questions

The following questions were used in the study;

1. How competent are Grade 4 learners with visual impairment at reading and writing braille grade 2?
2. What is the nature of reading and writing difficulties concerning braille grade 2 among learners with visual impairment in Ndola?
3. What are the common reading and writing difficulties among grade 4 learners with visual impairments at the school?

1.4 Theoretical Framework

The study was guided by one social science theory called Symbolic Interactionism Theory. This theory asserts that facts are based on and directed by symbols. The foundation of this theory is the meaning carried in symbols. Symbolic interaction examines the meanings emerging from the reciprocal interaction of individuals in social environment with other individuals and focuses on the question of "which symbols and meanings emerge from the interaction between people?' All interactionists agree that the source of

data is human interaction. Moreover, there is a general agreement among the symbolic interactionists that perspectives and empathy developing abilities of participants are the key subjects of symbolic interaction (Stryker and Vryan, 2003). This theory states that objects feature meanings within themselves and individuals formulate their activities in the direction of their evaluation of themselves and also people and objects around them. It assumes that symbols develop the mind and they are used as means for thinking and communication. Meaning is something attributed to objects, events and phenomenon. Meaning is a "physical attachment' imposed on events and objects by human. Ashworth (2000) stipulates that meaning is a condition that emerges as a result of the interaction of group members and not an intrinsic feature of the object. Consequently, meaning is created as a result of the interaction between people and meaning allows people produce some of the facts forming the sensory world. Thus, facts consist of the interpretation of various definitions. Meaning, language (language provides means [symbols] for debating meaning) and thinking principle. Symbolic interaction theory acknowledges the principle of meaning as the center of human behavior. Language provides a meaning to humans by means of symbols. It is symbols that differentiate social relations of humans from the level of communication of animals. Human beings give meaning to symbols and they express these things by means of language. Consequently, symbols form the basis of communication. In other words, symbols are indispensable elements for the formation of any kind of communication act in terms of braille for learners with visual impairment.

Learners with visual impairment derive their meaning from understanding the codes in Braille. They also express their thoughts in writing through Braille. Braille is symbolic, just like language uses symbols to illustrate meaning. It is most likely that the engagement with the codes or their conceptualization improves their conceptualization and mastery of what each code means, thereby contributing to cognitive development. The mastery of symbols imbedded in Braille codes in both Grade 1 and 2 Braille is the basis for learning literacy by learners with visual impairment. It can unlock the unforeseen circumstances that impede access to curriculum content for learners with visual impairment. If the symbols and their meanings are well and early taught, performance for learners with visual impairment in subsequent grade levels should not be a big hindrance

unless other factors take course. Constant interaction with the codes and their meaning should provide effective mastery of Braille by learners with visual impairment.

2. Literature review

Reading is an essential aspect the context of learning and education in general. Generally, education is known to encompass literacy, defined as "the ability to read and write.' Braille remains the main medium of reading and writing among persons with visual impairment. Proponents for the early introduction of braille contractions argue that it can allow 'beginning readers to take in larger chunks of text at a time and thus help them to process information faster' as well as helping to avoid the teaching of familiar words in two different forms – un-contracted and contracted braille. Children who are introduced to more contractions earlier in instruction perform better on virtually all reading and writing measures including vocabulary, decoding and comprehension and the use of contractions do not seem to impinge on fluency in oral reading (Johnson, 2009). This is a crucial component in the Zambian education system. A child who cannot read and write would really not benefit from the system because all the subjects taught in school involve reading and writing. Assessment at each level in terms of examination at grades 7, 9, 12 and tertiary levels are composed of aspects of reading and writing. However, the author does not specify in terms of years or grades that may be considered as early thus leaving the issue hanging.

The mechanics of how children read braille have been considered an important element in determining the speed and fluency in braille reading and have been the focus of much research. The research literature provides support for the view that two handed reading is more efficient (faster) than single handed reading and that most fast readers use two hands in a scissors movement. Frequency of characteristics such as hand pauses, 'scrubbing' of dots and regressions affect reading speed. Both hands read independently of each other and the left hand reads to the middle of the line where the right hand joins it and continues reading while the left hand moves to find the start of the next line. Improved

phonological skills can help reduce misspellings. Proof reading should be encouraged from an early age. Children who are introduced to higher number of contractions tend to do better in spelling than the children who are introduced to fewer contractions. Emphasis is usually placed on teaching the letters of which contractions are composed' (Ashworth, 2000). This is a good aspect that was investigated from the existing situation during research.

As students learn to read they must concurrently learn how to write. Writing is both a mechanical production of the symbols of a language and a process by which meaning is conveyed to an audience or readers. A pupil with visual impairment uses a Perkins Brailler, slate and stylus as an assistive device for writing.

Reading difficulties vary in the learners. They vary in terms of severity, nature and type. According to Johnson (2009) there are five types of reading difficulties. These types of reading difficulties include visual stress, tactile, phonological, phonemic and poor instructional. Each of these reading difficulties may manifest themselves differently in specific individuals at different levels of severity. Considering this, the learners with visual impairment may be exempted from visual stress reading difficulties looking at their condition. Individuals with this problem see the printed page differently, although they may not realise that they do. The classic symptoms in visual stress include: words moving around the page, blurred words, too bright a page so that one cannot see the words clearly, reading avoidance, skipping lines or words, loses place easily, difficulty understanding or copying text and poor distance judgment. The visual reading difficulties which have been explained above cannot exist among learners with visual impairments because they do not depend on sight to read. Instead, the readers with visual impairments use fingers to read. Therefore, the problems might have been tactile in nature. Research conducted in Britain Ashworth (2000) revealed a number of tactile perceptual difficulties experienced by readers with visual impairments. When a sighted individual is reading, one focuses his-her eyes on the stimulus. The eye transmits the graphs or printed shapes to the brain. Subsequently, the brain interprets the different shapes into letters and words. Morris and Blatt (1986) explained that like eyes, finger tips have sensitive nerves at the tip. With training, the fingertip transmits whatever it could be feeling on some surface to the brain. The brain interprets the touchable materials. Like eyes, finger tips can transmit the dotted

touchable and fellable dots on a piece of paper and the brain interprets the dots into letters and words. Due to the fact that, learners with visual impairments use fingers to read, they may have a problem of poor finger perception. The finger tips may have difficulties perceiving or detecting the dots in their correct positions, distances or shapes. Due to fingertip perceptual difficulties, an individual with visual impairments may confuse letters and words or sometimes skip lines and words. For Braille readers, left-right hand dominance is also important. The right finger always goes before the left finger to detect letters. For this reason, if a Braille reader had a challenge with hand dominance; he-she may be reading using one finger only. Reading using one finger would make it difficult to detect letters on a Braille paper (Stryker and Vryan, 2003). The question one may ask would be, do learners at the place under study experience such challenges? This was considered during the investigations.

As already alluded to, reading and writing problems are diverse in nature and form. Their manifestations would not be the same everywhere depending on a number of factors. Some of them are common while others would be experienced by a few. Research by Spungin (1989) has revealed that normally a middle basic school learner should be able to read at least ten million words in a particular school year. On the other hand, he contends that children with reading and writing difficulties read less than one hundred thousand words during the same period. In fact, this longitudinal study found out that there were an extraordinary and unacceptable number of children with reading and writing difficulties. It was found that on average, 38% of fourth graders nationally could not read and write at a basic level – that is, they could not read and understand a short paragraph similar to that in a children's book. Additionally, he indicated that at a global level, the prevalence of reading and writing difficulties had been estimated at 2 to 5% in school going children. Unfortunately, reading failure is disproportionately most common among children living in poverty. In many low-income urban school districts the percentage of students in the fourth grade who cannot read and write at basic level approached 70%. The educational and public health consequences of this level of reading and writing failure were dire. Of the 10 to 15% of children who would eventually drop out of school, more than 75% reported difficulties in learning to read and write. Likewise, only two percent of students receiving special or compensatory education for difficulties in learning to read and write

will complete a four-year college program. Despite this rich information on studies in western countries that were intended to establish the number of learners that would fail to complete school because of reading and writing difficulties, in Zambia, the Ministry of General Education has never under taken a deliberate study to verify the studies conducted elsewhere on similar issues especially on learners with visual impairments. However, the Zambia Agency for Persons with Disabilities (ZAPD) estimated that out of 5 learners with disabilities, only 2 of them would reach the twelfth grade. This would represent a progression rate of only about 40%. Nevertheless, ZAPD did not segment the types of disabilities and factors that could have led to such a low progression rate among learners with disabilities. The issue of a middle basic school learner reading at least ten million words in a particular school year would be a very good longitude study to undertake given a chance and resources.

Evans (1998) explained that there were pupils whose visual ineffectiveness would disadvantage their reading and writing abilities. According to him, 11% of people with reading and writing difficulties had the reading challenges which were caused by visual stress. Such people would have difficulties in word recognition, skipping words and lines, confusing letters and seeing words bleared. Similarly, in the case of learners with visual impairments, it was observed that 10% of the blind pupils demonstrated word recognition difficulties, skipping lines, and word or letter confusion. The said children also had difficulties in hand dominance. The findings seem to indicate that the difference between tactile reading difficulties and visual stress reading difficulties are negligible. These findings confirm the assertions argued that 90% of good Braille readers have very sensitive fingertip nerve cells. This means poorly developed finger tips or poor or faint Braille would lead to problems in transmitting information through the fingertip hence the tactile stress or tactile reading difficulties. It was pointed out that pronunciation difficulties, confusing spellings, and difficulties in recalling letters, attention problems and difficulties in understanding texts were of phonological in nature. These difficulties would heavily be neurological and those experiencing the said conditions may have little or no control over their difficulties. It was stated that “generally, 80% of people with learning disabilities are learners with various reading and writing difficulties”. The reading and writing difficulties referred to here are as a result of so many factors. Most of the underscored reading and

writing problems emanate from phonological and phonemic challenges. In order to illustrate the above information, in a research conducted in Sweden in 2013 on phonological related aspects, it was observed that 60% of immigrants studying Swedish had difficulties in word recognition and pronunciation. The revelations of the said research should be viewed as more realistic. Learning how to read and write a new language may not be easy. There are many reading difficulties that could emanate from mother tongue influence or failure to adapt to the new language. Some of the reading difficulties which would manifest as a result of language influence are pronunciations, spelling confusions and difficulties in understanding passages. The findings in Sweden cannot be dismissed in Zambia. Zambia is basically a Bantu speaking country. Children learn English as a second language. It would therefore be expected that many learners would experience similar difficulties as presented here. In order to explain the underlying factors for phonological reading difficulties, Chomsky pointed out that when a child is born, there is an inert language learning device or commonly referred to as the Language Acquisition Device (LAD). Any child therefore will easily learn the language that is spoken within the environment. The first language which is spoken the first five years would have a greater impact on the child than any other language learnt later. In a similar study, researches by the Ministry of Education in Zambia through the National Reading Committee in 1997 on investigating reading difficulties among primary school learners indicated that about 60% of grade seven leavers in the country had not developed good reading abilities. The major underlying factor for the poor reading skills among the Zambia primary readers was mother tongue influence which should have been as a result of poorly developed phonological and phonemic awareness in English.

3 Methodology

This study adopted a case study design. The rationale was to understand the grade 4s conceptualization and their experience with braille grade 2. The study sample consisted of 10 participants that included 8 learners with visual impairment and 2 teachers who taught the learners with visual impairment. Purposive sampling procedure was used to select the participants. Three research instruments were used to collect the qualitative data for this study. These were an assessment in reading and writing activities for the learners adapted

from the Zambian syllabus of learners' activity books for Braille grade 1 and 2, Focus group discussions of four learners with visual impairment and In-depth interviews for the teachers. Focus Group Discussions and Interviews are qualitative data generating methods that help to provide an in-depth understanding of a problem (Mkandawire, 2019; Muzata, 2017). Data were collected in phases between 9th April 2019 and 6th June 2019. In the first phase, learners did braille reading assessment activity. For reading, learners were called individually and subjected to reading a pre-prepared passage and the teachers evaluated and graded the reading standards and the learners were also given feedback. In the second phase, learners were exposed to the writing of an assessment activity. Their writing was evaluated and feedback was later given to the learners. In the third phase, they were exposed to two focus group discussions. These focus group discussions were done on the same day lasting for about 40 minutes to 1 hour each. All these activities were done within the school environment and within the normal learning school schedule (mornings and afternoons). In the fourth phase, the two teachers were first interviewed separately and later together. The Interviews lasted for about 20-35 minutes each while the joint one took about 40 minutes. The findings were analysed according to themes that emerged from data collected using the three instruments. The researchers drew out key issues discussed by participants. Direct quotes from participants were used in reporting. For ethical reasons, all identities of participants in this study have been withheld. Codes such as L1FGD1 to represent Learner 1 in Focus Group Discussion number 1 and T 1 and 2 used to represent the two teachers that participated in the study. Consent to participate in the study was obtained from the participants by way of signing consent forms before the study. Participants were allowed to withdraw from the study at any point if they were uncomfortable. However, none of the participants withdrew.

Although the overall sample was quite representative for qualitative research, the number of learners that took part in the study was quite limited as those were the only learners that were introduced to Braille grade 2 in Grade 4. Research that deals with learners with disability is commonly faced with sampling challenges due to various factors which include the inadequate homogenous samples (Muzata, 2020). However, since this was a case study, it should not be misconstrued as a weakness because the aim of case study in qualitative research is provide a detailed understanding of case in question

(Muzata, 2017) and larger samples are not the concern for qualitative researchers (Creswell, 2014).

4. Findings

The presentation of findings has been guided by themes derived from the study objectives. The study objectives were to establish the ability to read and write braille grade 2 competently in 4th Grade learners with visual impairment, to identify the nature of reading and writing difficulties concerning braille grade 2 among 4th Grade learners with visual impairment and to assess the most common reading and writing difficulties experienced by 4th Grade learners with visual impairments at selected school in Ndola.

4.1 Ability to read braille grade 2

Learners were given activity 1, designed to assess their ability to read words that use the letters of the alphabet in braille to represent the whole words; usually it is the first letter that is taken. Single letters used in this way to represent words are called 'Simple Upper Word-signs': 'simple' because they take up one cell, 'upper' because they have a dot in the top of the cell and 'word-signs' because they represent words. Generally the performance in activity 1 was not good with only two learners passing the assessment well, five tried and one did not perform well. Seven leaners managed to read the first two words represented by 'E'- Every, and 'K'- knowledge while one learner managed only the first one. One learner got everything correct, another one failed to read 1 word only, five got 3 Simple Upper Word-signs correct while one learner got only 1 word correct. After evaluation, the following were the observations: the learners had problems with two letters being: 'X' standing for the word 'it' and letter 'Z' standing for the word 'as'. The problem could be that these two words are read differently from others. The letter of the alphabet used is contrary to the words they represent. These need mastering and it was like learners had not mastered them well. They are contrary to others like, 'P' for 'people' and 'R'. Other difficulties observed were that learners were unable to distinguish one contracted word from another, they could not easily recall letters on a piece of braille paper, fingers

were suspected to have poor reading abilities and sensitivity, they could not easily remember spellings of certain words and could be that these contractions are similar to ordinary braille letters of the alphabet. For pronunciation, mother tongue influence was suspected for some learners. For one learner who was an albino, the partial sight that was being used was suspected to be not all that good to see clearly.

The above observations are linked to the following excerpts expressed in Icibemba by learners during the two focus group discussions. For instance, learner 1 from Focus Group Discussion 1 stated that:

> *Ba sir braille grade 2 yalikaba elyo limolimo ilatufulunganya, kuti waesha nomba yalikosafye (L1FGD1.*
>
> **Translation:** Sir, braille grade 2 is not easy sometimes it is confusing, you may try but it is challenging.

When asked to explain further the meaning of confusing, Learner 2 from Focus Group Discussion 1 came in and stated:

> *Mwamona ba sir, mu braille grade 1 balitufundile pali letter 'T'elyo nomba mu braille grade 2 batweba ati letter 'T'ngailifye yeka ilepilibula 'out'nomba walaishiba shani pali ifi fibili? filafulanganya ifi. (L2FGD1).*
>
> **Translation:** In braille grade 1, we were introduced to letter T' now in braille grade 2 we are told that this letter standing on its own means 'out' so how do you know which is which of the two? This is confusing.

Learner 4 from focus group discussion 2 stated that:

> *We confuse certain letters like 'D' and 'F', 'H' and 'J' (L4FGD2).*

When asked to explain why they experience such confusion, learner 2 from Focus Group Discussion 2 stated that:

> *These were the opposite of each other. It is really difficult to distinguish contracted and un-contracted braille (L2FGD2).*

From the excerpts, it could be deduced that learners had the issue of confusing letters, failure to distinguish between contracted and un-contracted braille. However, there could be unknown factors that this study may not have established that caused such confusions in letters among learners.

Learner 3 from focus group discussion 1 said:

> *Ba sir, limolimo braille ilaba kwati naifutika, wapishapo iminwe noumfwa nangu cimo. Wapela umunobe nao afilwa kanshi tulashupikwa sana (L3FGD1).*
>
> **Translation:** Sir, sometimes braille feels faint, you try to read but you feel nothing. You give a friend who also cannot feel anything, so we are sometimes troubled.

Learner 2 from focus group discussion 2 who was an albino indicated:

> *I have a problem with detecting letters correctly when I am reading using my partial sight. Even when I am using my fingers to read, I would many times have difficulties in detecting letters (L2 FGD 2).*

Teachers also reported the poor reading levels of braille grade 2 among grade 4 learners with visual impairments. Asked what the problem was with learners' difficulties reading braille grade 2, teachers said the following;

> *It is not easy to point out a specific reason for this. There are a number of factors including the way they were handled in the previous grades. (T1)*

Teacher 2 added that:

> *Braille grade 1 was not a problem but they could not manage braille grade 2. They were good in braille grade 1 but braille grade 1 was not required from grade 4 upwards. Not knowing braille grade 2 from grade 4 upwards implies challenges in reading of activities for the upper grades (T2)*

4.2 Reading Assessment activity 2- Words and abbreviations

Reading assessment activity 2 had 52 words in total. This activity consisted of a mixture of words and abbreviations. Braille grade 2 has a lot of abbreviations thus in reading, the learners were exposed to words and abbreviations. The aim was to assess learners' ability to read a mixture of words and abbreviations.

The evaluation was that: one learners' reading ability was very good. This was a boy. He managed to read all the 52 words and abbreviations correctly without any difficulty. Two learners reading was fair as they managed to read at least 30 words and abbreviations correctly but could not read the other 22. The remaining five learners' reading was not good. They managed to read only 12 words.

The reading of simple upper word-signs was not all that a challenge but they struggled with simple upper group-signs like; 'out/ou', 'ed', 'st' and 'ow'. Mostly, the learners had problems in reading abbreviations and lower group-signs like 'cc', 'dd' and 'gg'. Other observations were that some of the learners had their attention easily distracted as they were sensitive to noises and other sounds around the school environment. Some were using only one finger to read instead of two. Others during reading would have hand pauses, 'scrubbing' of dots and regressions. Some learners would tend to stop and move their fingers up and down on a character in an attempt to identify it. This practice is called scrubbing and slows reading of braille. One learner stated that certain pronouncing and getting meanings of certain words in English during reading was confusing like, 'was'(past) meaning 'akale' in Icibemba and 'walls' (potions of a building were the roof sits) meaning 'icibumba' in Icibemba. These words have the same sound but different spellings. Two learners who were using their left index fingers to read had difficulties in identifying letters and words.

To back up these assertions, below are the findings from the focus group discussions by the learners and interviews from the teachers.

Learner 1 from focus group discussion 2 stated that:

> *Sometimes we confuse certain letters or spellings in certain words. When this happens, it becomes difficult to read out some words thus we are forced to skip such words as we read (L1FGD2).*

Learner 2 from focus group 2 agreed with this and added that many of her friends sometimes skipped lines or words.

*L2FGD2).*From these narrations, it could be noted that learners' problems were diverse. *Sometimes we confuse certain letters or spellings in certain words. When this happens, it becomes difficult to read out some words thus we are forced to skip such words. L2FGD2).*

Learner 4 from focus group 1 indicated that:

> *The problem of detecting letters was common not just among the discussants but amongst most of the pupils in school (L4FGD1*).

When asked to mention other types of reading difficulties that they experienced, learner 4 from focus group 2 pointed out that:

limo limo tulakwata ubwafya ubwapusanya ama-letters yamo yamo (L4FGD2).

Translation: Sometimes we do have problems of differentiating or misplacement of certain letters.

The teachers acknowledged that majority of their learners had a problem with detecting letters and words when reading. Teacher 2 stated:

Because the learners had difficulties in detecting letters, their spellings were affected. The pupils would read certain words in vernacular. It was also very common to have pupils failing to distinguish between certain Braille contractions. The pupils would read the letters as opposites of each other (T2).

From these narrations, it could be noted that learners' problems were diverse in nature.

Activity 2- Assessment in the writing of grade 2 braille – Special signs

Activity 3 was assessment in the writing of braille grade 2. This activity was based on special signs to express five common words written by putting dot 5 in front of the letter. The five special signs for five very common words are 'and' '(dots 1 2 3 and 4 6), 'for' (dots 1 2 3 and 4 5 6) (all six), 'of' (dots 1 2 3 and 5 6), 'the' (dots 2 3 and 4 6), 'with' (2, 3 and 4, 5, 6).

Two learners, a boy and a girl managed to write all the five special signs correctly and quickly, one learner failed to write one word only, three managed 3 words while two managed to write only one word. Most of the learners had problems in writing the words 'with' and 'for". The observation was that learners were mixed up in thinking with the dots for the two. 'With' is dots 2, 3 and 4, 5, 6 while 'for' is dots 1, 2, 3 and 4, 5, 6 (all six). The difference between the two is that 'for' has all the dots while 'with' has no dot 1. Some learners had difficulties in inserting braille paper in the writing frame.

The findings from focus group discussions with learners and interviews with teachers revealed similarities with what was observed in learners' task 2.

Learner 1 from Focus Group Discussion 1 explained that;

The use of dots 2, 3, 4, 6: to mean 'the' and yet similar dots in the opposite mean 'z'. Another one is the use of 'this' which is the opposite of 'p' (L1FGD1).

Learner 4 from focus group 2 pointed out that:

> *Sometimes we have difficulties in inserting Braille paper into the writing frame. The Braille paper at times gets stuck into the writing frame and we spend more time in trying to remove the Braille paper (L4FGD2).*

Activity 3 - Assessment in abbreviations writing of braille grade 2

Activity 3 was designed to assess the learners' ability to write abbreviations in braille. Braille grade 2 has a lot of abbreviations thus it is important that learners master them. The observations after evaluations were that: One learner managed to write without difficulties, two tried with fewer difficulties. The rest faced a number of difficulties. The learners had difficulties in abbreviating 'st' in the word 'stop' using dots 3 4, abbreviating 'ch' in the word 'school' using dots 1 6, abbreviating 'gh' in the word 'high' using dots 1 2 6, abbreviating 'th' in the word 'bath' using dots 1 4 5 6 and abbreviating 'sh' in the word 'dish' using dots 1 4 6.

To back up these observations, below are the findings from the learners' focus group discussions and interviews with the teachers.

Learner 3 from focus group 2 said:

> *Sir, twalikwata learner 1, aba baume sir bena fyonse ukulemba na ukubelenga baume aba. niba Kaswili. fwebambi kuwayawaya fye ukulemba twabwelapo fye (L3FGD2).*
>
> **Translation:** Sir we have learner 1, this one is a real boy, both reading and writing are not an issue to him. He is a genius. Sir some of us when it comes to writing, it is really a struggle, we know very little.

Activity 5- Assessment in the writing of braille grade 2- Passage.

Assessment activity number 5 was designed to assess the learners' ability to write braille grade two using a combination of concepts like using abbreviations, special signs and simple upper word signs. The following were the observations after evaluation:

One learner managed to write the assessment activity 5 very well, two children tried with a fewer difficulties while the rest had a number of difficulties. Learners had difficulties in abbreviating 'sh' in the word 'Mailoshi'and 'she.' They also had difficulties in abbreviating 'th' in the words 'mother', 'think' 'these' and 'the'. They also had difficulties in writing

'ed' in the words informed 'answered an 'excited'. Double letters were also a challenge in the words like 'cattle' and 'giggling', 'St' was also a difficult in words like 'questions', writing the punctuation marks '?' and '!' was also a challenge. Every one managed to write a full stop and a comma**.**

To back up these observations, below are the findings from the focus group discussions and interviews from with teachers.

Asked how best learners felt teachers could help them improve their reading and writing ability of braille grade 2 especially those who had difficulties, Learner 2 from focus group 1 stated:

> *Contracted word cards were once used by our teachers and we were allowed to carry them after lessons. This gave us chance and time to master words. This did not take long, our teachers stopped. If this could start again, I feel it would help us improve our reading and writing ability (L2FGD1).*

Learner 3 from focus group discussion 1 also added that:

> *Ba sir, limolimo ngabalatupelako ifyakulemba nga twainuka nomba ifi taficitika. Tatukwata inshita ya kuilembela fweka nga twainuk (L3FGD1).*
>
> **Translation:** Sir, they would have been giving us something to write after school but this does not happen. We do not have time to practice writing on our own when we knock off from school.

When asked during the in-depth interview why contracted word cards and homework had stopped, Teacher 1 said:

> *Word cards and homework were given to learners to practice in reading and writing but due to the shortage of braille paper, styluses and writing frames, this could not continue (T 1)*

Giving homework meant giving learners braille paper, writing frames and styluses to use at their own free time which was not possible looking at the supply and flow of educational resources. Learners were not allowed to carry writing frames and styluses after lessons for security reasons. Once lost, it was not easy for the school to secure writing frames and styluses.

> *Not only has this but learners required more reading materials in braille grade 2. They also require class level text books for each subject and leisure reading materials. All these were not available in school (T1).*

From the teachers' perspective, it could be noted that adequate materials and equipment for reading and writing for the learners were not available in school.

The researchers administered three assessments in the writing of braille grade 2. The total number of words written correctly by each learner was counted, those words which the learners attempted but did not write correctly and those words that were not written correctly were also counted and the average for each category calculated.

Table 1: *Summary of Learners' nature of difficulties*

S No	**Difficulties**
1	Attention easily distracted
2	Braille feels faint
3	Confuse certain letters
4	Confuse spellings of certain words
5	Detecting letters in a word
6	Detecting words in a sentence
7	Difficulties in distinguishing contracted and un-contracted braille symbols
8	Difficulties in remembering certain letters
9	Difficulties in remembering certain words
10	Failure in understanding what they read
11	Inaccurate reading
12	Problem with pronunciation of certain words
13	Skipping of lines
14	Skipping of words
15	Slow in reading

Table 2: *Summary of the learners' performance in the written assessments*

Words presented	**Frequency** **57**
Average words written correctly	40
Average words attempted but wrong	25
Average Words not written at all	18
Average Time taken in minutes	25
Average Speed in words per minute	2

Table 2 above shows the summary of Learners' performance in the assessment of writing braille grade 2. In summary, concerning the learners' ability to write braille grade 2, it can be noted that some learners had the ability to write braille grade 2 well, while others seemed to be struggling.

4.3 Most common reading and writing difficulties experienced by learners

After going through all the difficulties experienced by the learners in reading and writing, it was observed that most of the learners had their attention easily distracted during the activities. Noting all the difficulties, a summary of those that were the most common difficulties were summarised in table form as reflected below:

Table 3: *Most common reading and writing difficulties*

#	**Difficulties**	**TYPE OF DIFFICULT**
1	Attention easily distracted	Phonemic
2	Braille feels faint	Tactile
3	Confuse certain letters	Tactile
4	Confuse spellings of certain words	Phonemic
5	Detecting letters in a word	Tactile
6	Detecting words in a sentence	Tactile

7	Difficulties in distinguishing contracted and un-contracted braille symbols	Tactile
8	Difficulties in remembering certain letters	Phonological
9	Difficulties in remembering certain words	Phonological
10	Failure in understanding what they read	Phonological
11	Inaccurate reading	Phonemic
12	Problem with pronunciation of certain words	Phonemic
13	Skipping of lines	Tactile
14	Skipping of words	Tactile
15	Slow in reading	Phonological

Table 3 above shows in summary the most common reading and writing difficulties experienced by the learners in school. From the findings, the most common reading and writing difficulties were phonological, phonemic and Tactile in nature.

5 Discussion of findings

Braille grade 2 is a tool for learning for learners with visual impairment. Once a child is able to read, he/she can do much more learning on his/her own. On the other hand, a child with reading and writing problems will face challenges in all other subjects and will continue to do poorly until the problem is rectified. Secondly, reading and writing are indispensable skills in terms of entertainment for one can experience ideas, adventures, feelings and situations that are expressed in form of print and are not available in everyday life. Not only this but reading is also an important means by which people obtain information about the environment and make use of it. In the Zambian education system, assessment activities to move from one level to another involve reading and writing in form of examinations. For example, at grades 7, 9 and 12, not forgetting at tertiary level in colleges and universities, assessment is done in the same form for one to be certified as having successfully completed any of these.

The findings were that learners had difficulties in mastering certain contracted symbols in braille grade 2, distinguishing one contracted word from another, recalling letters on a piece of braille paper, poor reading abilities and sensitivity. They could not easily remember spellings of certain words and that some contractions were similar to

ordinary braille letters of the alphabet. For pronunciation, mother tongue influence was observed and use of partial sight for the albinos. These findings were consisted with what Evans (1998) found out that pupils visual ineffectiveness would disadvantage their reading and writing abilities. Such pupils would have difficulties in word recognition, skipping lines, and words or letter confusion. Poorly developed finger tips or poor or faint Braille would lead to problems in transmitting information through the fingertip hence the sensitivity or tactile reading difficulties. Pronunciation difficulties, confusing spellings, and difficulties in recalling letters, attention problems and difficulties in understanding texts were of phonological in nature. These difficulties would heavily be neurological and those experiencing the said conditions may have little or no control over their difficulties.

During the study teachers could not easily indicate the causes of these problems. This too is in line with the findings of Evans (1998) that the reading and writing difficulties referred to here are as a result of so many factors. Most of the underscored reading and writing problems emanate from phonological and phonemic challenges. Learning how to read and write a new language may not be easy. There are many reading difficulties that could emanate from mother tongue influence or failure to adapt to the new language. Some of the reading difficulties which would manifest as a result of language influence are pronunciations, spelling confusions and difficulties in understanding passages. Therefore, despite the regional, social context, environmental and climatic differences in countries, these difficulties can be found in developed and third world countries among the readers of braille grade 2. Ashworth (2000) stipulates that meaning is a condition that emerges as a result of the interaction of group members and not an intrinsic feature of the object. Consequently, meaning is created as a result of the interaction between people and meaning allows people produce some of the facts forming the sensory world. These facts are related to how people form meaning.

It was found out that braille grade 2 was not easy but sometimes it was confusing. These findings do substantiate the revelation of Lusk and Corn (2006) that lack of tactual acuity is a problem faced by people learning to read through Braille and contributes to slow reading times. Lack of access to materials in braille contributes to such difficulties. This is true as in Zambia the availability of Braille books generally is not good in special schools.

The study revealed that some learners were using only one finger to read, displayed hand pauses, 'scrubbing' of dots and regressions could have a negative impact on learners as stated by McLinden and McCall (2002) that the mechanics of how children read braille have been considered an important element in determining the speed and fluency in braille reading. The research literature provides support for the view that two handed reading is more efficient (faster) than single handed reading and that most fast readers use two hands in a scissors movement. Frequency of characteristics such as hand pauses, 'scrubbing' of dots and regressions affect reading speed. This is called split or scissors patterns. Both hands read independently of each other and the left hand reads to the middle of the line where the right hand joins it and continues reading while the left hand moves to find the start of the next line. Good Braille reading is characterized by fluid movement across the page. Miller (1997) further suggests that proficient readers of Braille typically read with two hands, starting the line with the left hand and finishing it with the right. These findings could be supplemented by those of Miller (1997) that the visually impaired learners must be taught skills of finger manipulation. Unlike the eyes, fingers needed to be stimulated by the different environmental challenges. Teaching letter or symbol identification in braille reading and writing could not be separated from teaching correct finger and hand use.

On the nature of reading and writing difficulties concerning braille grade 2 the findings were in line with those of Johnson (2009) that reading difficulties included tactile reading challenges, phonological reading problems, phonemic reading difficulties and poor instructional reading challenges. Each of these reading difficulties may manifest themselves differently in specific individuals at different levels of severity. The finger tips may have difficulties perceiving or detecting the dots in their correct positions, distances or shapes. Because of the fingertip perceptual difficulties, an individual with visual impairments may confuse letters and words or sometimes skip lines and words. From the texts and studies presented and analyzed above, it is evident that persons with visual impairments do experience tactile challenges. The tactile acuity and sensitivity of a fingertip therefore ought to be very high in order for any person with visual impairment to read. From the above analysis, it is therefore possible that when Braille is very faint, confusion due to contractions or lack of adequate sensitivity on the right index finger tip, one can have perceptual problems. Other forms of reading problems were phonological

and phonemic in nature as stated by Morris and Blatt (1986). In summary, people with phonological and phonemic difficulties would display encoding and decoding difficulties. In fact, such individuals may have difficulties with pronunciations, spelling, and retrieval of information from memory, information retention challenges and comprehension problems.

The study also found that reading of simple upper group-signs, abbreviations and lower group-signs was a challenge. Some learners had their attention easily distracted by noises and other sounds around the school environment. Some words had their contraction symbols similar to the ordinary letters. These finding are similar to those of Johnson (2009) that reading difficulties vary in the learners. They vary in terms of severity, nature and type. The readers with visual impairments use fingers to read thus their difficulties might have been tactile in nature. This is also in line with Ashworth (2000) that the learners with visual impairment experience tactile perceptual difficulties. Morris and Blatt (1986) explained that like eyes, finger tips have sensitive nerves at the tip. The brain interprets the touchable materials.

Patience and much practice were needed because the learners needed to master the symbols used in braille correctly. This relates to the writings of Lowenfeld (1974) that sound/symbol (phonics)-based teaching method could be used to correct reading problems. In this method, teachers break words down into their smallest visual components: letters and the sounds associated with them. Then, the learner is taught one after another. This method can be adapted to teach visually impaired learners. Braille can be broken into smaller components and teach the fingers to get to feel a particular dot and later build up words. The learner may require the understanding of the various positions of the letter and other dots in order for him/her to develop an understanding about the phonemes. For the visually impaired, instead of seeing, they were to feel the shape of letters and words embossed. For example, a learner may feel the letter combination with his or her finger while pronouncing a word out loud. While a learner with visual impairments may not use sight, this method can still be used.

The problem of detecting letters was common with the two learners who were using their left index fingers to read. They had problems of differentiating or misplacement of certain letters. This was consistent with the findings of Johnson (2009) that to read Braille

effectively, the right index finger tip should be more sensitive in order to pass on the details of information to the brain for interpretation. The duty of the left index finger tip is to help in leading the right finger to the next line. Individuals with left hand dominance may possibly present difficulties in this area because if the left finger is used for reading, then, it will be difficult to locate the next line. The conclusion is that individuals with visual impairments whose tactile perception is poor would confuse letters.

It was also discovered that learners had little practice due to inadequate reading and writing materials. The speed of writing was also not good. This is in line with the findings of Waihenya (2000) that lack of funds makes it impossible to provide required class level text books and leisure reading materials and to maintain Braille machines. This makes it extremely hard for pupils with visual impairments to read and write Braille as fluently as needed. Literature indicates that practice enhances effective learning and mastery of concepts (Muzata & Ndonyo, 2019; Muzata, 2018).

A slate and stylus is a tool for writing Braille. There are numerous tools which can be used for writing Braille, but a slate and stylus could be considered the most basic, and also the oldest; akin to a pad and paper for sighted people. This writing tool is also very inexpensive, making it accessible to the blind in regions of the world where funds for more expensive Braille writing tools like typewriters are not available. It was unfortunate that the writing tools considered to be the most basic were an issue at the institution under review. These writing materials were not adequate thus denying the learners a chance to practice writing at their own free time. This is contrary to the assertion that this writing tool was inexpensive, making it accessible to the blind. The institution had a very big shortage. Due to this, the writing tool was never give to the learners to use at their own free time for safety reasons as losing them would make the school run without them. Without much practice in writing, learners cannot improve their writing abilities adequately. This also contrary to the writings of Hampshire (2014) that many companies manufacture slate and stylus sets, often at very low costs to make them accessible to all that many use them. Zambia has no company doing so thus availability and accessibility still remains a very big challenge. The challenges may easily be overcome once the pedagogy is oriented in the universal design for learning (Johnson & Muzata, 2019). Training learners with visual

impairments in the use of computers may provide a reliable alternative to effective learning instead of reliance on braille.

6. Conclusion

The importance of learning to write Braille to a learner with visual impairment cannot be underestimated. The study showed that the experiences of reading and writing braille grade 2 by the learners in grade 4 with visual impairment were marred with various challenges. From the findings concerning the learners' ability to read and write braille grade 2, it was discovered that the abilities of the learners were not the same. Some were good, average, while others were below average. The nature and most common problems in reading and writing found included difficulties in mastering certain contracted symbols, recalling letters, poor reading abilities and sensitivity. Learners could not easily remember spellings of certain words and that some contractions were similar to ordinary braille letters of the alphabet. For pronunciation, mother tongue influence was observed, difficulties in word recognition, skipping lines, and words or letter confusion. Others were poorly developed finger tips, phonological and phonemic challenges. Not knowing braille grade 2 from grade 4 upwards implies challenges in reading and writing of activities for the upper grades. One of the difficulties discovered was the issue of reading materials which were reported to be scarce in school. For a learner with visual impairment, learning to read and write Braille grade 2 is equal to independence, that is, the learner is able to read and write alone without relying on others. Having known these experiences, there is need for corrective measures; if not the education of the learners with visual impairment will remain underdeveloped and insignificant. It is prompt that all stakeholders get concerned and provide support to these learners.

6.1. Recommendations

In light of the findings the following recommendations aiming at improving reading and writing of braille grade 2 were made:

1. There is need for the school to procure and provide more reading and writing materials for the learners to have more practice.

2. Peer tutoring should be used as a teaching learning strategy where learners who are good at reading and writing of braille grade 2 should be asked to teach their friends.
3. There is need to be giving special homework to learners with reading and writing difficulties.
4. Teachers should train their learners' fingers adequately in order to help them acquire reading abilities easily.

References

Ashworth, P.D. (2000). *Psychology and 'Human Nature.* New York: Routledge.

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches (4th ed.),* London: Sage Publications Ltd.

Evans, J. (2014). The exercise capacity of Blind Children. *Journal of visual Impairments and blindness*, 75, 248 – 251.

Hampshire, B. (2014). *Working with Braille A study of Braille as a Medium of Communication.* Paris: The UNESCO Press.

Johnson, E. & Muzata, K.K. (2019). 'Inclusive Education: Implementing Universal Design for Learning'. In: M.K. Banja (ed.). *Selected Readings in Education Vol 2* (pp. 1-22), Lusaka: Marvel Publishers.

Hatlen, P. H. (1981). *Blind Children Learn to Read.* Springfield, IL.

Johnson, L. (2009). *The Braille Literacy Crisis for Children*. Journal of Visual Impairment Blindness, 90(3), 276.

Leporini, B. (2007). *An Accessible and Useable e-book as Educational Tool: How to Get it?* Granada: Spain.

Lowenfield, B. (1974).*Methods of Teaching Braille Reading.* Fredrick Burk Foundation, San Francisco State, College edition.

Lusk, K. E. &Corn, A.L. (2006b) *Learning and Using Print and Braille: A Study of Dual-Media Learners,* Part 2. Journal of Visual Impairment and Blindness 100(11): 653-665.

McLinden, M. & McCall, S.,(2002). *A Review of the Literature into Effective Practice in Teaching through Braille.* Visual Impairment Centre for Teaching and Research – University of Birmingham.

Miller, S. (1997). *Reading Through Touch*. London: Routledge.

Morris, R. & Blatt, B. (1986). *Special Education: Research and Trends.* New York: Prego man Press.

Mkandawire, S.B. (2019). 'Selected common methods and tools for data collection in research' In: M.K. Banja (ed.). *Selected Readings in Education Volume 2* (pp. 143-153), Lusaka: Marvel Publishers.

Muzata, K.K. (2020). Complexities of sampling in special education research: a Zambian contextual analysis. *European Journal of Special Education Research*, 6 (3), 96 – 109.

Muzata, K.K. & Ndonyo, T. M. (2019). 'The Practice based Model: A Proposed Training Package for Special Education Trainee Teachers in Zambia' In: M.K. Banja (ed.). *Selected Readings in Education Volume 2* (pp. 23-41), Lusaka: Marvel Publishers.

Muzata, K.K. (2018). Teaching Skills of Special Education Students during Teaching Practice: The Case of the University of Zambia Pre-service Special Education Students. *Multidisciplinary Journal of language and Social Sciences Education*, 1, (1), 103-137.

Muzata, K.K. (2017). Curriculum implementation for learners with special education needs: the case of selected inclusive and special schools in Zambia. PhD Thesis, University of South Africa, http://uir.unisa.ac.za/handle/10500/24571

Simalalo, M. (2006). 'Challenges in Teaching and Learning Mathematics by Visually Impaired Pupils'. Masters dissertation, University of Zambia available @ http://dspace.unza.zm/handle/123456789/545

Samuels, C. A. (2008). *Braille Makes a Comeback.* Education Week.

Spungin, S.J. (2009). *Braille Literacy: Issues for the Blind Persons, Families, Professionals and Producers of Braille.* New York: American Foundation for the Blind.

Stryker, S. & Vryan, K.D. (2003). *The Symbolic Interactionists Frame. Handbook of Social Psychology.* New York: Springer.

Vanderstoep, S.W. & Johnston D.D. (2009). *Research Methods for Everyday Life.* San Francisco: CA: Jossey-Bass.

Waihenya, K. (2000); *8-4-4 Locks Out Disabled Children.* East African Standard.