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10-year-olds reading for meaning? A study of Sesotho Grade 4 learners' foundational reading skills

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Background: South Africa's PIRLS 2021 outcomes revealed that learners struggle with comprehension. The reasons for poor reading need to be identified and addressed to stem this challenge.

Aim: This study assessed Sesotho Grade 4 learners' knowledge of simple and complex letter sounds, their oral reading fluency and the relationship to their oral reading comprehension.

Setting: Data were collected by testing 103 Grade 4 Sesotho home language learners in five schools.

Method: Early Grade Reading Assessment instruments adapted for Sesotho were used, which included simple and complex letter sound knowledge tests and an oral reading fluency test with six comprehension questions.

Results: Firstly, the results show that most of the sampled Grade 4 Sesotho learners could identify only 33.01 of the 70 single-letter sounds and 19.52 of 40 complex letter sounds. Secondly, most learners struggled to correctly pronounce single-letter and single-syllable function words with simple letter sounds. Thus, learners could only read 30.54 words correct per minute (wcpm). Lastly, significant positive correlations between complex letter sounds like diagraphs and trigraphs, reading accuracy and oral reading comprehension were revealed.

Conclusion: Knowledge of letter sounds is vital for decoding alphabetic languages with shallow orthographies, which follow the phonological route for processing written texts. It facilitates accurate decoding, which is a prerequisite for reading fluency and comprehension.

Contribution: There is a need for Sesotho evidence-based and adequately paced phonics programmes to systematically teach the knowledge of letter sounds in the foundation phase to strengthen reading fluency for comprehension.

Keywords: decoding; letter sound knowledge; reading fluency; reading comprehension; comprehension levels; orthography.

Introduction

South Africa has prioritised large-scale measurement and monitoring of reading comprehension outcomes across the country in standardised assessments. Thus, South African learners have been participating in standardised assessments such as the Progress in International Reading Literacy Studies (PIRLS) (Howie et al. 2008) and the Southern and Eastern Africa Consortium for Monitoring Educational Quality (Moloi & Chetty n.d.). According to Howie et al. (2008), the prioritisation of these measurements was because the Department of Education has recognised language and reading literacy as some of the important priorities in education. Participation in these assessments has highlighted issues relating to South African learners' reading capabilities which are concerning and, therefore, warrant scrutiny to understand where the problem lies. The results of these assessments, particularly those of the PIRLS, show that most South African Grade 4 learners are unable to comprehend what they are reading.

The four PIRLS studies that South African learners participated in, that is, the 2006, 2011, 2016, with the latest being the 2021 cycle, show that South African Grade 4 learners are unable to read with comprehension. The 2021 results even show that gains made in the past 10 years were reversed because of learning losses incurred during the coronavirus disease of 2020 (COVID-19) period (Ardington, Wills & Kotze 2021). The latest study showed that 81% of South African

learners could not read for meaning in any language, obtaining a score of 288 (SE = 4.4) points; and that Sesotho learners' performance plunged from 319 in 2016 to 258 points in 2021 (Department of Basic Education 2023). This is a steep fall, which is worrying. The 258 points represent the PIRLS benchmarks that categorise learners' reading ability numerically from the lowest (400) to the highest (650) points within a scale of 0–1000 (Phillips 2014). These benchmarks or levels, as they will also be referred to, indicate comprehension processes in which learners understand or do not understand, with the levels being the ability to:

1. retrieve explicitly stated information (at 400 points);
2. make straightforward inferences (at 475 points);
3. interpret and integrate ideas and information (at 500 points); and
4. evaluate and critique content and textual elements (with 650 points) (Mullis & Martin 2021; Mullis et al. 2023).

These authors further explain the level of text engagement that readers should display at each level. However, because Grade 4 Sesotho learners achieved way less than 400 points, which indicates the inability to retrieve explicitly stated information or, in other words, inability to demonstrate literal comprehension and making straightforward inferences, the article shall focus on what retrieving explicitly stated information means to clarify South African learners' reading level in general and Sesotho learners in particular. However, it is important to mention that the sampled Grade 4 learners who wrote PIRLS 2021 include both learners to whom Sesotho is a home language and some who may not necessarily speak the language at home but learn it at school because of language dynamics in the community and thereby in schools.

The last two benchmarks (interpret and integrate ideas and information, and evaluate and critique content and textual elements) require readers to make inferences at a global level of text, which is unattainable if the first two prove to be challenging. To make inferences at the third and fourth benchmarks, readers need to first access the literal meaning of texts. Mullis and Martin (2019:13) explain that to retrieve explicitly stated information, readers will engage with texts to:

- look for specific ideas;
- search for definitions of words or phrases;
- identify the setting of the story (time and place);
- find the topic sentence or main idea (when explicitly stated); and
- identify specific information in a graph (e.g. graph, table, map).

These authors further mention that to retrieve this information successfully, the reader needs 'immediate or automatic' understanding of the words, phrases or sentences while being able to recognise that they are relevant to the information sought. Before a reader can understand words, a they needs to recognise or decode them. For example, a sight word such as 'above' will be recognisable if the reader has encountered it before and knows its meaning. However, a regular word such as 'bold' can be recognised if a reader had encountered it multiple times before or decoded it, if it is new. Sesotho words are all regular and thus need to be decoded to be recognisable. However, words that have been read repeatedly can become like sight words and be automatically recognisable; these can include function words which in Sesotho are short, single-letter or single-syllable words such as '*e*', '*a*' and '*le*' or '*ho*'.

The inability to answer questions that require readers to retrieve explicitly stated information in texts, therefore, may indicate that readers are unable to recognise or decode words successfully. Magliano et al. (2023) state that even at secondary school level, reading challenges often revolve around decoding, fluency, vocabulary and comprehension and these are skills that are identified as important by the National Reading Panel of 2000.

This study focuses on decoding, which is espoused in the knowledge of letter sounds and fluency as basic skills that should support reading with comprehension. Pretorius and Klapwijk (2016) state that without decoding, comprehension is not possible. Decoding is one of the two skills advocated by Gough and Tunmer's (1986) 'simple view of reading' (SVR).

Conceptual framework and literature review

Reading comprehension is said to involve visually perceiving letters and words, converting them into speech sounds (decoding), parsing linguistic information, developing an initial understanding of propositions based on the given information, and integrating propositions for an accurate and coherent mental representation, referred to as the process of making meaning from written text (Young-Suk 2023:335). Because of its complex nature, reading comprehension problems can thus stem from a deficiency of any of these skills (Oakhill, Cane & Elbro 2019).

Gough and Tunmer's (1986) SVR model simplifies this otherwise complicated process, while the active view of reading (AVR) model by Duke and Cartwright (2021) shows reading in its comprehensive form. This latter view of reading is an extension of the simple view of reading (SVR) and thus both models will be discussed as they fit as lenses for analysing reading in important ways.

The SVR is an interactive reading model that proposes that to read with comprehension, readers should be able to decode written language and have linguistic comprehension (Gough & Tunmer 1986). Linguistic comprehension, though important, is outside the scope of this study. The SVR model analogises reading comprehension as the product of a multiplication sum exemplifying that the two skills, decoding multiplied by linguistic comprehension, equal reading comprehension (D × L = RC). The multiplication sign represents the point at which the two skills interact to

materialise comprehension. The model thus predicts that a proficient reader at any level will possess both strong decoding and language comprehension skills, while a poor reader will be lacking one or both of these competencies (Wills et al. 2021). Many researchers have utilised the SVR model as an analytic framework for assessing reading comprehension (Protopapas et al. 2012). Hogan, Adlof and Alonzo (2014:199) state that the model 'does an excellent job in explaining the reading comprehension developmental span not only in beginner readers but also in adult readers'. An investigation by Kendeou, Savage and Van den Broek (2008:34) found that the 'SVR described the performance of university students with and without known reading difficulties'. Florit and Cain (2011) studied the developmental patterns of relations between reading comprehension, decoding, and linguistic comprehension in children reading in English and those reading transparent languages and found that SVR accounts for approximately 40% – 80% of the variance in reading comprehension for readers ranging from 8 to 16 years. This means there were differences in how decoding and linguistic comprehension played a role in the reading comprehension of the said sample. Languages with a transparent or shallow orthography e.g. IsiZulu are writing systems with direct spelling sound correspondences, while opaque languages like English have inconsistent relationships between letters and sounds. Though the SVR model continues to be a helpful lens for teachers and researchers for reading instruction and analysis, it has also been viewed as limited in capturing what is entailed in this complex skill (Catts 2018). Duke and Cartwright's (2021) AVR model broadens the SVR model by first using the broader term word recognition and language comprehension instead of decoding and linguistic comprehension. In this model, the authors (ibid.) show that reading is facilitated by three major skills, viz, active self-regulation (motivation, engagement and executive function skills), word recognition (phonological awareness, alphabetic principle, phonics knowledge and decoding or recognition of words at sight) and language comprehension which includes (cultural and other content knowledge, reading specific background knowledge, verbal reasoning, language structure and theory of mind). Another component of the AVR model are the skills that capture the overlap between word recognition and language comprehension, which Duke and Cartwright (2021) conceptualise as the bridging processes that will be briefly defined later. The concepts of interest that will be further explored in this article are decoding and reading fluency, the latter being a skill that is viewed as the bridge between decoding and comprehension (Pikulski & Chard 2005).

Decoding

Gough and Tunmer (1986:7) describe a skilled decoder as a reader who can 'read isolated words quickly, accurately, and silently'. Furthermore, the authors explicate the concept of decoding by mentioning that they do not equate it to word recognition because the term decoding denotes the use of letter sound correspondence rules, meaning word recognition can refer to recognising whole words (Chamba & Ramirez 2021), which is associated with the lexical route to reading (Dehaene 2009). The lexical route to reading is when a reader associates the printed word with the corresponding acceptable pronunciation without decoding it.

For example, English words such as 'your', 'said' and 'could' are learnt by sight as they frequently appear in texts and young readers may encounter them in texts before they have learnt the relevant letter sounds. Decoding, on the other hand, is an especially essential skill for young children (Aarnotse et al. 2001) learning to read transparent languages like Sesotho. Blending letter sounds to pronounce words is the only route to initially recognise written words in these languages, unlike for readers of opaque languages such as English or French. Opaque languages have irregular words that are recognisable through the lexical route (Beech & Awaida 1992; Dehaene 2009).

Decoding helps learners to retrieve known words and to identify those that are unknown. On the one hand, Moats (1998:1) mentions that the ability to sound out new words accounts for about 80% of the variance in first grade reading comprehension and it continues to be a major factor in text comprehension as students' progress through the grades. On the other hand, Ganhdi et al. (2017) state that the comprehension of students who experience decoding difficulties cannot be properly measured because their word reading accuracy interferes with their understanding of text. This shows the overlap between decoding and reading comprehension, which is facilitated by the ability to recognise words and understanding the language mentioned in the AVR model.

The decoding hypothesis threshold also suggests that the relation between decoding and reading comprehension can only be reliably observed above a certain decoding threshold (Wang et al. 2019). These authors report that in their study of a sample of 10 000 Grades 5–10 students, 38% of Grade 5 and 19% of Grade 10 students who were below the decoding threshold did not make progress in their reading comprehension. However, Gough and Tunmer (1986) say the influence of decoding on comprehension fades as learners ascend to higher grades and linguistic comprehension becomes more important. Therefore, if a reader's decoding is below the desired threshold, their reading fluency and comprehension will be impacted by reading errors related to decoding, slowing down their reading pace. Kalayci and Diken (2020) list 'skipping a letter, skipping a syllable, adding a letter, spelling out' as some of the reading errors that are directly related to decoding. The erroneous decoding brings to focus the overlap between decoding and language comprehension described by the AVR. The model shows the overlap between word recognition and language comprehension in what it calls the bridging processes. These bridging processes include print concepts (awareness that print conveys a message), reading fluency (ability to read with proper speed, accuracy and expression), vocabulary knowledge (knowledge of words and their meanings), morphological awareness (explicitly thinking about smallest units of meaning in language named morphemes) and

graphophonological semantic cognitive flexibility (ability to simultaneously and actively switch between letter sound and meaning). These skills are directly linked to the ability to simultaneously decode or recognise words and their meanings when reading connected texts, which is catalytic for reading with comprehension and whose absence or deficiency can impact it. The question then becomes, 'What can facilitate error free decoding and/or word recognition, consequently fluency and comprehension?' Gough and Tunmer (1986) mention that decoding utilises the knowledge of letter sounds to pronounce especially unfamiliar words. Therefore, what impact does the knowledge of letter sounds have on decoding?

Letter sound knowledge and learning to read

In reading, the sounds of language are related to letters, and that understanding is referred to as the alphabetic principle (Liberman, Shankweiler & Liberman 1989). Letters are basic building blocks of writing, and learning about letters and their properties is an important foundation for reading and writing (Kim 2023; Treiman, Stothard & Snowling n.d.:3). The knowledge of letter sounds is referred to as the ability to provide the sound(s) associated with a particular letter form (e.g. /b/ for *b* as in *bat*) (Huang, Tortorelli & Invernizzi 2014). Tortorelli, Bowles and Skibbe (2017) state that letter sounds have the closest relationship with decoding.

Letter sound knowledge is a constrained foundational reading skill that learners should acquire and master early to facilitate decoding of words in written texts. Constrained abilities are those that consist of a limited number of items and can thus be mastered within a relatively short time frame (Tortorelli et al. 2017). For example Sesotho has 39 phonemes represented by a variety of single and other letter combinations.

To demonstrate the knowledge of letter sounds, learners should be able to provide the sound 'automatically, fluently, and accurately and be able to sound out capital and lower-case letters that are randomly nominated and know consonants and vowels' (Reutzel & Cooter 2012:2). However, Dodd and Carr (2003:129) caution that learning letter sounds can be difficult because 'letter forms are graphically abstract with no prior iconic significance and are also very variable forms as print may change in size, font and case'.

The skill is critical for learners when learning to read (Sigmundsson et al. 2017). Inability to grasp letter sound knowledge negatively affects the development of decoding (Nieto 2005). O'Carroll (2011:9) explains that without letter sound knowledge, 'novice readers will just see reading as remembering a visual sequence of letters using whatever cues that are most helpful, such as word length and shape … they will not begin to experiment with emergent writing and invented spelling'. According to Lyon (1997), the root of reading difficulties is largely attributed to linking letters with sounds. Lyon (1997) further describes how these difficulties are observable by adding that the:

> [S]igns of such difficulty are a laboured approach to decoding or sounding unknown or unfamiliar words and repeated misidentification of known words. Furthermore, reading is hesitant and characterised by frequent starts and stops and multiple mispronunciations. (p. 16)

Letter sound knowledge is assessed by letter sound recognition (i.e. pointing to the appropriate letter when the sound is given) and letter sound recall (saying the letter sound) or letter reproduction (writing the letter when the sound is given) (Dodd & Carr 2003:129). In transparent languages such as Turkish, Finnish and therefore Sesotho, accuracy in letter sounds and word reading is achieved early – by the end of Grade 1 (Durgunoglu & Öney 1999).

For Setswana learners, and by extension Sesotho learners, to reach acceptable reading levels in various grades, they are required to correctly sound 40 letters per minute to set the tone for the required reading rate of 40 correct words per minute by the end of Grade 2 and 60 by the end of Grade 3 (Wills et al. 2021). As mentioned earlier, mastery of letter sound knowledge is a precursor for reading fluency through smooth decoding which is free from decoding difficulties mentioned by Lyon (1997) and Kalayci and Diken (2020).

A study by O'Carroll (2011) showed significant correlations between early Grade 1 letter knowledge and end of Grade 1 word reading and spelling skills. Other studies also show the significance of letter sound knowledge in early literacy development (Khosa 2021; Thórsdóttir, Hjaltalín & Sigmundssonn 2023). The synthetic approach to reading suggested by the Curriculum and Policy Statement (CAPS) requires that the correspondence of letters and their sounds be taught for learners to blend them to decode words in texts (Johnston, Mcgeown & Watson 2011). Decoding, therefore, becomes the precursor for reading fluency and reading fluency enables reading with comprehension.

Reading fluency

Reading fluency includes accuracy, the correct recognition or pronunciation of the spoken words corresponding to written words, speed or rate of reading, and ability to read materials with expression and comprehension (Galletly et al. 2009). As mentioned in the introductory section, reading fluency is one of the bridging skills in Duke and Cartwright's (2021) AVR model. Fuchs, Fuchs and Hosp (2001) say the following on the complexity of reading fluency:

> Reading fluency represents an extremely complex process, as the reader must integrate perceptual skills to automatically translate letters to coherent representations, lexical skills to unitise those sound components into recognisable wholes, and processing skills to identify meaningful connections within and between words and sentences, relate text information with prior knowledge and make inferences to fill the gaps in the text. (p. 240)

Reading fluency and comprehension are inter-related (Àlvarez-Cañizo, Suárez-Coalla & Cuetos 2015) and Pikulski and Chard (2005) liken it (fluency) to a bridge between decoding and comprehension. The analogy of the

bridge points to its relationship to comprehension (LeVos 2021). Fluent reading is facilitated by automatic word recognition which requires practice in recognising letter sounds in words, and words as wholes which translates into the ability to recognise words instantly without effortfully decoding them (Murray 2016).

When too much effort is spent on decoding words, it hampers and slows down fluency, which in turn impairs comprehension (Ehri 2005). Effortful decoding limits the capacity of attention and working memory in cognitive processing, while recognising words automatically frees the space for higher-order thinking (LaBerge & Samuels 1974; Berninger et al. 2001).

To assess reading fluency, researchers have developed a procedure that uses grade-level texts to determine the number of words that can be read correctly in 1 min (Hasbrouck & Tindal 2006). The score is calculated as the total number of words read, minus words read incorrectly (to measure accuracy) within a time span of a minute (to reflect rate), resulting in an integrated score of words correct per minute (wcpm).

Wills et al. (2021:36) analysed fluency measures (wcpm) in relationship to reading comprehension to determine reading benchmarks for Setswana. The authors mention that accuracy moderates the relationship between speed and comprehension and point out that reading errors reduce reading speed and clutter working memory. Their analysis of Setswana Grades 3–7 oral reading data showed that at all grade levels, learners reading below 40 wcpm tend to have very poor comprehension. It was only when learners reached a fluency level of 60 wcpm or more that they could demonstrate basic understanding of the texts. The fluency benchmark set for the Sotho languages by the end of Grade 3 was, therefore, 60 wcpm. When all these foundational skills (letter sound knowledge, decoding, reading fluency and vocabulary) are fully developed, they conglomerate to assist a reader to focus on constructing the meaning of the text. Before the methodology of the study is expatiated on, a brief description of the language in focus, Sesotho, is provided.

Sesotho

Sesotho is a disjunctive, largely transparent language with some aspects of opacity because of orthographic vowels *e* and *o*. These vowels have low and high tones that alter the meanings of words. For example, the word with spelling *noka* can assume different meanings based on the tone used to pronounce the vowel *o*. Some of the meanings it can take include river, salt (as in salting) and waist.

The language uses 22 of the 26 letters of the Roman alphabet to organise the 37 phonemes that represent all the sounds in the language. These phonemes are represented by single letters such as *t* and *m*, diagraphs such as *kg* and *ph* and trigraphs such as *tsh* and *tjh*. Furthermore, these letters can appear as a string of up to five consonants before a vowel is inserted in some words. For example, the applicative verb *ntshwara*, meaning being held, is a trigraph blend epitomising the longest string of letters in a word in the language. An applicative verb is a Sesotho verbal extension that indicates that the action is applied towards an object (Lodhi 2002), and in the case of this example, the object is the first person.

Based on the Curriculum and Assessment Policy Statement guideline that one or two sounds be taught per week (National Curriculum Statement: Sesotho Home Language 2011), Sesotho letter sounds can be taught within the first 37 weeks of the first grade and be reinforced and internalised by learners throughout the foundation phase to develop fluency through ongoing reading.

Based on the literature discussion presented earlier, the study will therefore endeavour finding out which reading skills may be responsible for deficient comprehension experienced by Sesotho learners by answering the following research questions:

Research questions

1. *What is the overall Grade 4 Sesotho learners' performance on measures of letter sound knowledge (simple and complex letter sounds)?*
2. *How many words can Sesotho Grade 4 learners read correctly per minute?*
3. *What is the overall performance of learners on oral reading comprehension?*
4. *What is learners' performance on each comprehension question?*
5. *What is the relationship between letter sound knowledge, oral reading fluency and oral reading comprehension?*

Research methods and design

Research design and ethics

This study is a cross-sectional survey design based on reading data of Sesotho Grade 4 learners extracted from the researcher's PhD study. The study explores the knowledge of simple and complex letter sounds, the oral reading fluency and the oral reading comprehension of a subsample of 241 learners.

Research context and participants

The subsample for this study was 103 (64 girls and 39 boys) Grade 4 Sesotho learners drawn from a larger population of 241 participants for a doctoral study from five quintile 3 and 4 schools in Soweto. According to CAPS 123, the quintile system in South African public schools classifies schools into five groups, from the poorest (quintile 1) to the least poor (quintile 5). Four of the schools use Sesotho home language as a language of learning and teaching (LoLT) in foundation phase and as a subject in Intermediate Phase. One of the schools, School 3, also had isiZulu as a home language and LoLT. Learners who participated in the study all had Sesotho as a LoLT in foundation phase.

The schools seemed to be well-managed as there were systems in place to ensure that teachers and children were in class during class times. School grounds looked well-maintained, and all schools seemed to be equipped with the necessary teaching and learning resources as the Grade 4 classrooms were print rich, had mobile class libraries and other utilities in classes such as pens, exercise books, and Department of Basic Education (DBE) books and other reading materials. The DBE books are state-designed workbooks for language subjects, mathematics and life skills meant to enhance learning these subjects in primary schools.

Instruments

Grade 3 instruments were utilised to assess Grade 4 learners because the study was conducted during the COVID-19 lockdown period when attendance was disrupted. Three instruments were utilised to test learners, and they included the following:

1. A 153-word narrative passage titled '*Tshoswana le Leeba*' [The Ant and the Dove] accompanied by six questions (four literal and two inferential) was read out loud by learners.
2. A chart with 70 Sesotho single letters representing simple letter sounds arranged in rows of 10 letters each. The letters were randomly placed in lower and upper case, and most were repeated across the list.
3. A chart with 40 Sesotho complex letter sounds including digraphs, trigraphs and various blends ranging from two to four letter blends.

Both the oral reading fluency text and letter sound charts were previously used to assess the letter sound knowledge, oral reading fluency and comprehension of Grade 3 Setswana learners for the Early Grade Reading Assessment (EGRA), which can prove reliability and validity for this study. However, Spaull et al. (2020) caution that short oral comprehension assessments are not ideal as a comprehensive metric of comprehension but, in this and other studies, it serves as an index that helps clarify the relationship between decoding, oral reading fluency and comprehension.

Assessment procedures

Data were collected between May and August of 2021. For both assessments (oral reading fluency and letter sounds), learners were assessed individually, and tests lasted for about 10–12 min. The first test that was administered was the oral reading fluency test. A text copy from which learners read was provided while the researcher had another with each learner's name on which the researcher recorded errors at the 1-min mark and a cell phone timer was used to time their reading.

Sitting opposite each other with a table in between, learners read the passage for 3 min while the researcher recorded reading errors, indicated the 1-min mark and stopped learners at the third minute. The 1-min mark is a reading rate measure for the number of words a learner can read correctly within that period known as wcpm. The 3-min interval was allocated to allow learners to reach the point in the text at which the six comprehension questions would be asked.

The oral reading test was followed by the simple and then complex letter sound tests. The letter sound knowledge tests were also timed for 1 min each, and all errors were noted. For the oral reading fluency task, the total number of words read per minute was counted and the words on which errors were made were subtracted and then a score was allocated. Similarly, for the letter sound tests, the total number of letters identified was recorded, and the number of letters wherein learners made errors was subtracted and a score was allocated. For the oral comprehension task, the six questions were marked with a tick for correct responses and a blank for incorrect ones. Each question was allocated one mark, and a score was allocated based on the number of questions learners correctly responded to. The oral comprehension task was untimed.

Data capturing and analysis

After all tests were scored, the scores were captured and analysed using SPSS version 20.0.1.0142, and descriptive and inferential statistics were generated. The results are presented in the next section.

Ethical considerations

Ethical clearance to conduct this study was obtained from the University of Johannesburg Faculty of Education Research Ethics Committee (No. Sem 2-2019-026). Participation was voluntary, and parents' consent forms were issued and signed by parents because learners were minors, and the confidentiality and anonymity of schools and learners were maintained throughout the study.

Results

Normally distributed data have a bell-shaped curve described by its mean, standard deviation and extreme values (Mishra et al. 2019). To test for normality, a Shapiro–Wilk test was used. Table 1 shows the results of this test.

The results of the test reveal that the data departed significantly from normality for the three variables tested. The *p*-values for all three were less than 0.05. These results may be an indication that there may be a relationship among the variables tested whose means are all deviating from the norm. Table 1 shows the normality test results for simple and complex letter-sounds as well as wcpm.

TABLE 1: Shapiro–Wilk test results.

Variables	W	*df*	Sig.
SLS	0.918	95	< 0.001
CLS	0.896	95	< 0.001
wcpm	0.956	95	0.003

SLS, simple letter sounds; CLS, complex letter sounds; wcpm, words correct per minute; *df*, degrees of freedom; Sig., significance.

Table 2 shows the results for all skills tested. Overall, the mean scores reveal that most learners achieved scores around 50% or less of total scores for each of the variables.

Simple and complex letter sounds

The results in Table 3 are related to the research question that asks: 'What is the overall Grade 4 Sesotho learners' performance on measures of letter sound knowledge (simple and complex letter sounds)?'

The statistics in Table 3 show that for simple letter sounds, most learners could identify just under half of the 70 letter sounds, while for complex letters, they obtained just above half of 40 correct letters per minute. The high standard deviations show a wide dispersion of scores not clustered around the mean. Further analysis of the results shows that learners achieving zero stood at 10% for simple letters and 17% for complex letters.

The next set of results is associated with the research question that asks 'What is the level of learners' performance on lower- and upper-case letters, diagraphs, trigraphs and blends?' Table 4 shows the number of expected pronunciations per category of letters based on the number of participants and the errors they made.

The highest number of errors were made with lowercase and uppercase letters than with digraphs and blends. This however does not necessarily show that learners performed worse on the two skill rather that that they had more items than the latter two.

Oral reading fluency

The outcomes in Table 5 are in response to the research question, 'How many words correct per minute could learners read?'

The results revealed that most learners could read an average of 34 wcpm. This may mean learners' reading fluency was not optimal. Additionally, fifteen of the 103 learners did not attempt to read at all, which calculated to 15% of the sample. The percentiles reveal that at the 25th percentile, learners could read only 7 words per minute that 50% could 32 words, while at the 75th percentile, they could read only 49.

Scrutiny of errors made by learners on the oral reading fluency test showed that learners committed reading errors on short function such as *e*, *a*, *le* and *ho* as well as on content words. Table 6 shows the number of errors learners made on short, frequent function words during the oral reading fluency test.

The function word that most learners experienced less difficulty while reading was *a*, and *ho* proved to be the most challenging.

Table 7 shows results for content words with complex letter sounds that learners struggled with during the oral reading test.

The least mispronounced word was *hobaneng* [why] while the most mispronounced word was *Tshoswana* [Ant] (sound /tsh/, a trigraph).

Oral reading comprehension

The oral reading comprehension text was accompanied by six questions which were asked orally by the researcher. Half of the questions were literal, while the other half was inferential. The next set of results in Table 8 is in relation to the question, 'What is the performance of learners on oral reading comprehension?'

A mean score of 2.47 was obtained by most learners. Statistics further reveal that 34% of learners got a zero score, while the percentiles show that at the 25th percentile, learners attained 0% score while at the 75th, a maximum of 4 was attainable.

The results in Table 9 are in relation to the research question, 'How did learners perform on each comprehension item?'

TABLE 2: Descriptive results for all skills tested.

Variables	*N*	%	Max	Mean	SD	Percentiles		
						25th	50th	75th
SLS	103	10	70	32.05	23.69	5	36	54
CLS	103	17	40	20.81	13.25	6	21	32
LSK total	103	0	110	53.31	18.78	6	29	43
Wcpm	103	16	82	34.32	23.04	7	32	49
ORCT	103	53	6	2.47	2.14	0.00	2	4

SLK, simple letter sounds; CLS, complex letter sounds; wcpm, words correct per minute; ORCT, oral reading comprehension total; LSK, Letter-sound knowledge; SD, standard deviation.

TABLE 3: Descriptive results on simple and complex letter sounds.

Variables	*N*	0%	Max	Mean	SD	Percentiles		
						25th	50th	75th
SLS	103	10	70	32.05	23.23	10	37	54
CLS	103	17	40	20.81	13.09	9	23	32
LSK total	103	0	110	53.32	18.78	8	30	43

SLK, simple letter sounds; CLS, complex letter sounds; LSK, Letter-sound knowledge; SD, standard deviation.

TABLE 4: Total number of errors for simple and complex letters sounds.

Item	Expected	Number of errors
Lowercase letters	3399	768
Uppercase letters	3605	601
Blends	2987	396
Digraphs and trigraphs	1133	309

TABLE 5: Results for words correct per minute.

Variables	*N*	0%	Max	Mean	SD	Percentiles		
						25th	50th	75th
wcpm	103	15	82	34.32	23.04	7	32	49

wcpm, words correct per minute; SD, standard deviation; Max, maximum.

TABLE 6: Function words incorrectly read during the oral reading fluency test.

Single-syllable words	a	o	sa	wa	ba	le	ye	ke	Ne	ka	ho
Frequency of errors	7	22	4	7	10	15	15	16	19	24	27
Percentage of errors (%)	20	63	11	20	54	43	43	46	54	69	77

The scores showed that question 2, which was a literal question, was the easiest, while question 6, an inferential question, was the most difficult.

Relationship between, letter-sound knowledge, oral reading fluency and oral reading comprehension

The last set of results addresses the question relating to the relationship between letter sound knowledge, oral reading fluency and comprehension. Because the data are not normally distributed, a nonparametric Spearman's test was used to measure correlations between the tested variables. Table 10 presents the results.

These results reveal significant positive correlations among all variables, with wcpm and complex letters showing highest correlation at 0.859**, while that between single-letter sounds and oral reading comprehension was the lowest at 0.611**. The correlation results show values that are close to +1, which indicate that the knowledge of simple and complex letter sounds is strongly related to each other and also strongly related to oral reading fluency and comprehension.

Discussion

This study aimed to assess Sesotho Grade 4 learners' knowledge of simple and complex letter sounds and oral reading fluency to establish their relationship with oral reading comprehension. Overall, the scores showed low performance across all measured variables.

The CAPS document suggests the synthetic phonics as an approach for teaching reading. As explained in the literature review, the synthetic approach requires that the correspondence of letters and their sounds be taught for readers to blend them to decode words in texts (Johnston et al. 2011). To reach decoding levels that will positively impact comprehension, Setswana reading benchmarks and thresholds require learners to correctly sound 40 letters by the end of Grade 1 (Wills et al. 2021). Poor letter sound knowledge, therefore, translates to poor decoding (Nieto 2005), and poor decoding precipitates dysfluent reading, which impacts reading comprehension negatively (Ganhdi et al. 2017).

The first research question sought to find out 'What is the overall Grade 4 Sesotho learners' performance on measures of letter sound knowledge (simple and complex letter sounds)?' The outcomes showed that most learners could identify only 32.05 of simple letters sounds and above just 20.81 of complex letter sounds.

These results are consistent with those of other studies that measured letter sound variables in other African languages from both the Sotho and Nguni clusters. A study by Spaull et al. (2020) of Northern SeSotho, Xitsonga and isiZulu Grade 3 learners also revealed that learners could only read 28 letters correctly per minute. Another study by Ardington et al. (2021:13), which analysed isiXhosa, isiZulu and siSwati Grade 3 learners, indicated that many learners 'are not mastering this basic skill by the end of Grade 3'. One in 10 learners across the pooled data 'was unable to sound one letter correctly at the end of the Foundation Phase'.

TABLE 7: Words with complex letters that were incorrectly read in the oral reading fluency test.

Word	English	Errors
hobaneng	why	8
nokeng	at the river	9
dutse	sitting	10
leng	other	13
moriting	in the shade	24
tsatsi	day	29
tjhesa	hot	33
nyorilwe	thirsty	37
tjodietsa	sing(bird)	59
Tshoswana 2	ant	34
Tshoswana 1	ant	74

Note: The words written in italics are non-English words.

TABLE 8: Performance on oral reading comprehension.

Variable	*N*	0%	Max	Mean	SD	Percentiles		
						25th	50th	75th
ORC	103	34	6	2.47	2.14	0.00	2	4

ORC, oral reading comprehension; SD, standard deviation; Max, maximum.

TABLE 9: Learner performance per question in frequencies and percentages.

Question	Question level	0	%	1	%
1	Literal	50	49	53	52
2	Literal	46	45	57	55
3	Inferential	47	45	56	54
4	Inferential	69	67	34	33
5	Literal	57	55	46	45
6	Inferential	78	76	25	24

TABLE 10: Correlation matrix for single and complex letter sounds, words correct per minute and oral reading comprehension.

Variables	Single-letter sounds	Complex letter sounds	Wcpm
SLS	-	-	-
CLS	0.756*	-	-
wcpm	0.652*	0.859*	-
ORCT	0.611*	0.808*	0.824*

SLK, simple letter sounds; CLs, complex letter sounds; wcpm, words correct per minute; ORCT, oral reading comprehension total.

*, Level of significance closest to 1.

Additionally the results revealed that learners made a variety of errors in sounding out both sets of letter sounds such as:

(a) sounding Sesotho simple letters as English letter names, e.g. saying *aee* for phoneme */a/*;
(b) replacing one sound with another, e.g. /s/ for /r/, /tjh/ for /tj/ and /sh/ for /shw/;
(c) pronouncing simple sounds as though they were accompanied by vowels *a* or *e* (e.g. /ma/ for /m/ and /le/ for /l/) and sounding letters more than once in an attempt to correct themselves.

The errors identified earlier indicate that the participants have not mastered this basic reading skill considered prerequisite for decoding according to the SVR (Gough &

Tunmer 1986). Poor performance in this foundational, constraint skill, which Durgunoglu and Öney (1999) say can be grasped by the end of Grade 1 for transparent languages, could be attributable to a variety of factors, including:

- inappropriate method of teaching the skill, and teachers' lack of pedagogical content knowledge;
- slow pacing of teaching the skill which is taught up to Grade 3 according to CAPS guidelines;
- lack of appropriate materials for teaching learning, and retaining the skill;
- lack of extended reading opportunities at school and at home for consolidation of the skill.

The participants' deficient knowledge of letter sounds manifested itself in their reading fluency.

Reading with fluency is considered the bridge between decoding and comprehension (Pikulski & Chard 2005). Without it, reading effort is directed towards decoding words rather than comprehension them (Ehri 2005). The oral reading fluency results for this study were in relation to the research question, 'How many words per minute can Sesotho Grade 4 learners read correctly per minute?' Statistics showed that the mean score was 34.32 wcpm, which constitutes just above half the 60 wcpm requirement by the end of Grade 3 stipulated by Setswana reading benchmarks. Low performance in oral reading fluency was also found in studies by Ardington et al. (2021), Spaull et al. (2020) and Wills et al. (2021).

During this test, reading errors on short function words with single letter and single syllable such as *e*, *o*, and *ke*, *sa* and lexical words with both simple and complex sounds, such as *haholo* [a lot] and *leeba* [dove] and those with digraphs and trigraphs such as *tsatsi* [day] and *tshoswana* [ant], were mispronounced. Learners were not sure about initial and end sounds in words which required them to re-read them in a quest to correct errors. Reading errors on short function words was puzzling as these are words that frequently appear in all Sesotho texts and learners should have automatised. Within the 34-word range that most learners could read, there were 17 of these words, almost half the number of words that learners could read within a minute. The question is, what type of errors learners make on short Sesotho function words, and what impact does it have for reading fluency? This is a puzzle that can be solved by further research.

Coming back to reading errors on lexical words, the two most mispronounced words in this test were *tshoswana* [ant] and *tjodietsa* [singing of birds] by 51% and 35% of participants, respectively. The word *tshoswana* appeared twice within the 34-word range, potentially increasing the number of incidences of mispronunciation as some learners errored the second time. Of the 51% participants who mispronounced the word the first time, 21% still mispronounced it the second time. However, the fact that only 21% of the participants mispronounced the word the second time shows that 30% of the participants may have read it correctly because of re-reading it, highlighting the importance of repeated reading.

In the letter sound test, the phoneme /*tsh*/ contained in the word *tshoswana* was correctly pronounced by only 45% of the participants. In the letter sound test, the grapheme (*tsh*) *was* also inconsistently correctly pronounced by learners at the various intervals that it appeared in the test as it appeared more than once on the letter sound chart. The grapheme *tsh* was confused with either *ts* or *tjh*, while diagraph *tj* was pronounced either as *j*, *tjh* or as *ts*.

Tjodietsa, the second most mispronounced word, was the 36th word in the oral reading text, meaning that the 35% of learners who mispronounced it are outside the bracket of the 34.32 wcpm readers. Perhaps the percentage of learners who mispronounced the word could have been higher had learners read up to the 36th word, increasing the mean number of words read incorrectly per minute.

An interesting observation in relation to words with complex letters was the reading error the sampled learners made on words ending with digraph *ng*. The digraph appeared at the end of words such as *moriting* [in the shade], *hobaneng* [why], *nokeng* [at the river] and *leng* [other]. The phoneme proved challenging as most learners re-read some of the words containing it having initially omitted the sound only to go back to the beginning of the word to sound it out. Or maybe because words ending with 'ng' are odd to the syllable structure of consonant-vowel cv which most Sesotho follow. Paige (2020) also mentions that students with an inadequate inventory of words recognised automatically are unlikely to become fluent readers, and dysfluent readers are unlikely to comprehend what they read. 'It could also be that' these learners have rarely encounters words ending wing 'ng' in their inventory. The slow reading pace of participants precipitated by inaccurate reading of words because of a deficient letter sound knowledge could be attributable to lack of reading practice. Stanovich (1986) states that differences in reading are partially because of the amount of practice they receive in reading and writing. These letter sound knowledge and reading fluency results described earlier do not bode well for comprehension. Slocum et al. (1995) state that students who score higher on comprehension tests were also faster in reading letters and words in text. Ganhdi et al. (2017:1) say that: 'Students who have challenges decoding text, their word reading accuracy interferes with measuring their comprehension and understanding of text'.

Oral reading comprehension results of a 2.47 mean score out of 6 calculated to 41% illustrated low comprehension as predicted. The comprehension test consisted of three literal and three inferential questions. Statistics show that, generally, the percentages of learners who responded correctly to literal questions hovered around 50%, while the numbers of correct responses plummeted for inferential questions. Participants who could not answer inferential questions 4 calculated to 69% while for question 6 they made up 78%. The oral reading comprehension results of Spaull et al.'s (2020) study revealed that learners achieved 49%, which is 8% more than for this study. These results are also comparable to those for Setswana EGRA (Wills et al. 2021).

Poor performance on literal and straightforward inference questions, which require readers to search for an answer by referring to the text (Eason et al. 2012) from a short text, potentially points to a struggle with decoding and recognising words as proved by the oral reading fluency results of this study. It could indicate that learners were unable to read both the questions and the corresponding text successfully. The chain reaction from letter sound knowledge, to wcpm and to comprehension shows how these skills are all essential contributory factors that can make or break reading with comprehension.

The last research question that sought to establish relationships among the three measured variables asked: What is the relationship between letter sound knowledge, oral reading fluency and oral reading comprehension of Grade 4 learners? The Spearman correlation test results showed that there were significant correlations between all variables tested. The study by Vaz (2024) illustrated not only how letter sounds affect oral reading fluency and how fluency affects comprehension, but also how letter sounds have a direct influence on comprehension. Figure 1 shows these relationships.

Other studies that also investigated relationships among decoding, reading fluency and text comprehension show strong correlations (Ardington et al. 2020; Spaull et al. 2020; Wills et al. 2021). The strong correlation among these variables may indicate that there are relationships among them and all play a role to achieving comprehension, and that a weak grasp of each may be the weak link that contributes to poor comprehension.

A conclusion that can be drawn from this study, therefore, is that most of the participants could decode, but not accurately enough to read fluently because of poor letter sound knowledge. The inaccurate slow reading hindered their capacity to attend to comprehension. Spaull et al. (2020:14) mention that 'only once reading becomes relatively fast and accurate, do other variables such as vocabulary knowledge, inferencing abilities, text genre, and background knowledge account for differences in reading comprehension'. However, these researchers state that studies showing high oral reading fluency and high reading comprehension in African languages are yet to be conducted to corroborate their proposition. The outcome of this study thus calls for the enhancement of Sesotho Foundation Phase curriculum for:

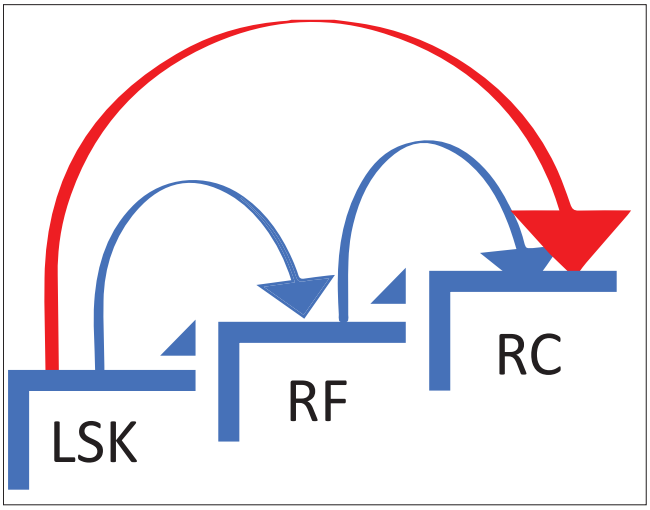
- letter sound knowledge learning and retention through evidence-based reading programmes including phonics materials such as work and decodable books;
- strengthening reading fluency to automaticity through guided repeated reading practice, through the provision of interesting reading materials that will draw learners to consistently engage in reading.

Also, the curriculum for initial teacher training should include the pedagogical content knowledge of the components of reading as encapsulated in the AVR generally, and the relationship between decoding or word recognition, reading fluency and comprehension.

Conclusion

This study analysed the relationship between letter sound knowledge, oral reading fluency and oral reading comprehension of Sesotho Grade 4 learners in the bigger quest to identify possible contributing factors of poor reading comprehension of written texts. The results are clear on the importance of both simple and complex letter sounds for decoding texts accurately, and thus fluently, to facilitate comprehension. This revelation highlights that competency in letter sounds and function words cannot be disregarded as possible causes of reading comprehension problems and must, thus, be considered for research, reading instruction and intervention in both the foundation and the intermediate phases. It is, however, important to consider that the study was conducted during the COVID-19 period where learning loses were incurred as schools tried to adhere to protocols for preventing the spread of the virus. This cohort of learners who lost the chance to build and consolidate the necessary skills and knowledge to read with comprehension may have somewhat recovered or continue to carry this deficit throughout their schooling life depending on the support received through structured interventions.

The implications of this study therefore may be that going forward, foundation phase learners' reading data, especially that for Grade 3 learners, must be taken into consideration in relation to their performance in the PIRLS and other reading assessments. For instance, the EGRA results, which assess the learners' letter sound knowledge and reading fluency in the foundation phase, could be correlated to PIRLS results to determine learners whose reading comprehension may have been affected by a deficit of some foundational skills. The reading gaps that these learners incurred because of the pandemic should have been systematically addressed. Wanzek et al. (2010) state that reading gaps persist and widen if intervention is not timeously implemented to close them. Although various interventions were initiated by the Department of Education post the pandemic, it is not clear



LSK, letter-sound knowledge; RC, reading comprehension; ORF, oral reading fluency.

FIGURE 1: The relationship between letter-sound knowledge, oral reading fluency and reading comprehension.

whether they were specifically dedicated to reading. The absence of systematic reading interventions may mean this cohort of learners will continue with a reading deficit throughout their schooling careers and probably adulthood.

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