Impact of linguistic complexity in English language texts on South Africa's primary school grade 3 to 4 transition

Lucy Sibanda
Sol Plaatje University, South Africa

Reading challenges occasioned by the third to fourth grade transition in South Africa's primary schools are well-documented, particularly in content area texts. Grade 4 reading heralds a shift from narrative text to content text reading, the latter credited with greater reading demands than the former. There is, however, dearth of research on how language texts, which are largely narrative, represent a linguistic complexity at the grade 3 and 4 interface. Using *English First Additional Language* grade 3 and 4 workbooks within the South African context, this research documents the extent of the linguistic complexity between the texts from grade 3 to grade 4. Both content analysis and readability formulas were employed to determine manifest factors impacting textual and linguistic complexity in two workbooks, and the workbooks' grade levels respectively. Content analysis evinced steep increase in textual complexity of all five factors analysed; and readability formulas revealed that grade 3 workbooks were higher than third grade level, and grade 4 workbooks' levels were slightly higher. This study recommends that workbook authoring be in accordance with research-based indicators of textual and linguistic complexity, with consideration of readability formulas in texts prior to adoption for use in schools.

Introduction: Grade 3 to 4 transitional challenges

In South Africa, grade 3 and grade 4 learners are normally 9-10-year-olds in their third or fourth year of formal schooling. The challenge of reading in grade 4 is well-documented (Sweet & Snow, 2003; Mcnamara, Ozuru & Floyd, 2011; van Staden, 2011; Rubiner, 2016). Although the challenge is an international phenomenon, it is more prevalent among learners from low performing and disadvantaged schools, and within second language learning contexts. Some learners manifest adequate reading from grade 1 to grade 3, and suddenly struggle with reading when they enter grade 4. Chall, Jacobs and Baldwin (1990) named this phenomenon the 'fourth-grade slump'. It describes learners falling behind in reading due to a shift from 'learning to read' in grades 1 to 3 and 'reading to learn' in grades 4 to 6 (Spaull, 2016). The significant impact of this "fourth-grade slump" upon future learning has been acknowledged internationally (Lesnick, Goerge, Smithgall & Gwynne, 2010; Spaull, 2016).

Various grade 3 to 4 transitional challenges have been identified in South Africa. According to Sibanda (2017, p. 1), there are "challenges which impose particular competence needs on the learners, whose satisfaction determines the extent to which subsequent learning and attainment are constrained or expedited. Where the transition is too complex for learners, they hardly recover." Hernandez (2011) and Feister (2013) also confirmed that readers who struggle to read at grade 3 normally fail to catch up academically with their peers, and as a result, drop out of high school or fail to graduate from higher education. The trend is true even within home language contexts; with the

challenge credited mainly to the shift from 'learning to read' to 'reading to learn' (Howie, Venter & van Staden, 2008). In South Africa, the Department of Education (DoE, 2003) noted that many South African learners may not be reading at grade level when they enter grade 4. Spaull (2016, p. 1) confirmed that "most children in South Africa do not learn to read for meaning by the end of grade 3 and remain perpetually behind." South African learners perform very poorly in reading both in African home languages and in English or Afrikaans (Pretorius & Spaull, 2016).

The other challenge specific to the South African context and similar educational contexts, is the shift from the use of home language in the Foundation Phase (grade R to grade 3) to the use of the language of learning and teaching (LoLT) from grade 4 and upwards. The shift occurs before learners even become literate in their first language (Setati & Barwell, 2008; Spaull, 2016).

Sibanda and Baxen (2016) also noted another challenge which complicates the grade 3 to grade 4 transition. This is the shift in the nature of the texts from narrative texts to expository texts where, the latter are more challenging on account of their embodiment of technical and academic vocabulary (an example of a narrative text is a short story and an example of an expository text is a life skills textbook). The assumption is that content area texts make more textual demands on the reader than, for instance, language texts which take a more narrative presentation of content. What has not been interrogated is the extent to which narrative texts at grade 4 represent a significant shift in the textual demands made on the reader between the two transitional points.

The assumed complexity of expository texts emanates from their dense technical and academic vocabulary, and the fact that they are read for information, not pleasure. There has, therefore, been an assumption that narrative texts, which can be read for enjoyment and are not riddled with academic and technical vocabulary, present no transitional hurdles. This article interrogates the extent of the shift in language complexity between *English First Additional Language* (EFAL) grade 3 and grade 4 workbooks in South Africa. The study is guided by two main research questions, with question 1 framed into two sub-questions.

1. What is the extent of the quantitative difference in the language demands between grade 3 and grade 4 Department of Basic Education (DBE) 2019 workbooks?
    a. Is there a significant increase in the volume of material read between grade 3 and grade 4?
    b. How significant is the increase in the complexity of the language used between the grade 3 and grade 4 *English First Additional Language* workbooks?

2. Are the selected *English First Additional Language* workbooks at the appropriate level for grade 3 and grade 4 learners?

Review of literature

In South Africa, the Department of Basic Education (DBE) has provided Grade R to 9 learners in public schools with workbooks since 2011 (DBE, 2015). For literacy/language, each workbook is made up of 128 easy-to-follow worksheets organised into four worksheets per week, divided over eight weeks per term. The workbooks structure learning activities for learners (DBE, 2015), and provide teachers, especially those in resource-scarce settings, with systematic worksheets to support teaching and learning. Apart from offering practice with language skills taught, they help teachers track learner progress and provide extra requisite support. Workbooks complement rather than displace textbooks, by allowing learners to work in them. However, in resource-stressed environments, the workbook is sometimes, the only source of reading material some learners will ever have. Coupled with their ubiquity, their close alignment with the curriculum; the *Curriculum and Assessment Policy* (CAPS) (DBE, 2015), workbooks are important resources and determinants of teaching and learning.

Having established the critical importance of workbooks as teaching and learning resources and established the nature of grade 3 to 4 transitional challenges, it is important to review text readability factors by which the complexity of the workbooks at the transitional point can be determined.

Text readability factors

Text readability, which denotes the ease with which material can be read and understood, is meant to ensure "…that a given piece of writing reaches and affects its audience in the way that the author intends" (Zamanian & Heydari; 2012, p. 45). Text readability is a measure of various factors that either enhance or constrain it. This study focuses on word difficulty and sentence length; variables used in both the study's readability formulas and content analysis; as well as the little used textual volume and comprehension question difficulty, in the content analysis.

Word length
Word length is a quantitative measure of syllables and letters. The number of syllables in a word is used more to determine word length than the number of letters making up the word. Word difficulty stems from the number of a word's syllables (poly-syllabic structure); and the more the syllables, the more difficult a word is considered to be (Muncer, Knight & Adams, 2014; Schuster & Erickson, 2014). In general usage, a poly-syllabic word is a word that is regarded as long. Children often read multiple-syllable words with less accuracy, which affects their comprehension (Álvarez-Cañizo, Suárez-Coalla & Cuetos, 2015).

Sentence length/complexity
Although sentence length is not the only determinant of sentence difficulty, in general, longer sentences are more complex. Sentence length for readability is measured by the number of words in a sentence, where the longer the sentence, the more difficult the text, and the less the comprehension, especially for second language readers. An average

sentence for Grade 4 learners learning in English as a second language should have eight to 10 words (Korger, 1992). Readers find sentences of 8 words or less very easy to read; 11 words, easy; 14 words fairly easy; 17 words standard; 21 words fairly difficult; 25 words difficult and 29 words or more, very difficult (Sanyal, 2006). Long and complex sentences compromise text readability more than short simpler sentences (Wray & Janan, 2013). However, short choppy sentences detract from text readability. Graves and Graves (2003) observe that some sentences become longer because examples and illustrations are included in order to enhance comprehensibility. Long sentences make greater demands on the reader's memory, and usually contain complex structures of coordination and subordination which reduce readability (Sibanda, 2013).

For most South African learners, confirmed to be poor readers (Spaull, 2016), long sentences are likely to pose problems during reading. Álvarez-Cañizo, et al. (2015) observed that reading long sentences makes readers forget the first part of the sentence by the time they finish the sentence.

Sentence types
In English, there are four types of sentences, the simple sentence, compound sentence, complex sentences and compound-complex sentence. The simple sentence contains one independent clause. The compound sentence contains two or more independent clauses, while the complex sentence has one independent clause and one or more dependent clauses, and the compound-complex sentence has two or more independent clauses and one or more dependent clauses. For a text to be more readable, it is recommended that simple sentences be used (Rubens, 2001). Mc Intyre (1996) stated clearly that reading long complex-compound sentences might be very difficult for readers to understand. Text readability can also be measured quantitatively by means of readability formulas which predict the grade level commensurate with a particular text.

Comprehension questions

Barrett designed a taxonomy for reading comprehension, divided into five different categories, literal comprehension, reorganisation, inferential comprehension, evaluation and appreciation. In this taxonomy, questions are ordered from easy to difficult according to each category contained and covered based the difficulty of competence. The taxonomy is used by teachers of English to analyse instructional materials and to develop materials to ensure that the various forms of questions are used to help learners respond to a variety of types of comprehension (Collins, 2014).

There are other factors which can also affect the readability of textbooks, which include legibility of print, illustrations and colour of the text. These, however, have not been considered in this study. Legibility refers to those aspects of typography which determine how readily the letters and words of the text will be deciphered. These include font size and type used. It also includes layout features such as line length, size of margins, leading (the space between the lines and words), colour of paper and print. These are important especially when writing a text for young learners. They need to be user friendly and attractive to learners. Children also enjoy books which contain pictures, and in fact,

interesting and colourful pictures, are often a great motivating factor for them to read (Triggs & Frost, 2015). The pictures need to be captioned. According to Mayer (1989), graphics should be captioned or supported by text and are only meaningful to the reader if they have this textual support.

Readability formulas

In order to have successful reading experience, children should read books that are at their levels, not too challenging and not too easy. Hence, matching a reader's level and the book's complexity is an important exercise (Allington, 2012). This is what readability formulas seek to do. Readability formulas were also used in this study to determine text readability. They were developed to provide teachers, librarians and textbook writers with a way to objectively and analytically predict text readability. The readability formulas are mathematical formulas designed to predict the grade level a reader should have in order to read and understand a particular text. Considering the readability factors discussed above, readability formulas identify word difficulty and sentence length as major aspects of language that determine text difficulty or ease (Zamanian & Heydari 2012). While word difficulty is a measure of the number of syllables a word has, Perkins (2010) noted that sentence difficulty relates to sentence length as measured by the number of words in a sentence.

Over 200 readability formulas have been developed by different scholars (Humphreys & Humphreys, 2013). Now there is the online *Text Readability Consensus Calculator* (n.d.) which has been used in this study. It uses seven well-established readability formulas, to calculate the average grade level, reading age, and text difficulty of selected parts of given texts. The seven readability formulas combined in the *Text Readability Consensus Calculator* (n.d.) are the Coleman-Liau Index, Flesch-Kincaid Grade Level, Flesch Reading Ease, the Gunning Fog, the Linsear Write, the Smog Index, and the Automated Readability Index. These formulas calculate the number of syllables, words, and sentences in the selected sample (some of the factors considered in the readability factors discussed above), and assign a readability index to the text. The program takes the output of these numbers and plugs them into the seven readability formulas mentioned, thereby potentially increasing the validity of the findings.

Readability formulas are considered useful in determining the grade level of reading material, and for providing an independent, objective and valid measure of text readability (Zamanian & Heydari, 2012). They work well when they are used in conjunction with content analysis. While readability formulas determined textual complexity on the basis of word difficulty and sentence length, I applied content analysis to determine the volume of text; word and sentence complexity; and comprehension question difficulty. Online readability tools are still being used to determine text difficulty (Kasule, 2011; Sibanda, 2014).

Research method

In this study, data were generated through content analysis and readability formulas. Content analysis examined the quantitative differences in language demands between grade 3 and grade 4 English language workbooks. Secondly, readability formulas predicted the readability of the workbooks and determined the grade levels for which the workbooks were suitable. The readability formulas complemented content analysis, and the study benefitted from their objectivity and consistency.

Sampling

Current 2019 workbooks used in South African schools were selected for analysis. Workbooks, which have extensive readership owing to being supplied to all learners at no cost by the education department, were preferred to textbooks. Their ubiquity meant their availability to every learner. The second *English First Additional Language* workbook for grade 3 (term 3 and 4) was selected as it was the one learners used before they exited grade 3 for grade 4. The term 1 and 2 workbook for grade 4, in the same subject area, was selected as it was the entry text to grade 4. The two workbooks, therefore, represented the levels at which learners were expected to read at this transitional stage. For ease of reference, the grade 3 workbook is hereinafter, referred to as *book 3* while the grade 4 workbook is referred to as *book 4*. The choice of *English First Additional Language*, not *Home Language* workbooks was because, according to the DoE (2005), the first additional language assumes that learners do not have adequate knowledge of the language. A related assumption was that the *English First Additional Language* workbooks were easier than the *English Home Language* workbooks.

From each of these workbooks, what was considered for analysis were all the passages. In this study, a passage refers to a part of a book, it could be a short story, a poem, speech, piece of music, or a dialogue. It could have one paragraph or more. Book 3 had 14 passages while book 4 had 15. Considering all the passages in the books enhanced the reliability of the study compared with a sample of passages.

Data collection

Data collection was in the form of quantitative content analysis and the application of the readability formulas. The former consisted of quantifying reading material in the two texts in terms of number of pages, passages, words and sentences in the passages; the word length; types of sentences; and levels of comprehension questions derived from the passages. The rationale was to compare and contrast the volume of material that needed to be read in the two workbooks, to determine whether the quantitative increase was not of such magnitude as to impact readability, as well as the complexity of the material.

Readability formulas were applied to all passages to determine the grade levels for which the workbooks were suitable and respond to the question: Are the selected *English Additional Language* workbooks at the appropriate level for grade 3 and grade 4 learners? The passages were copied and pasted onto the *Free Text Readability Consensus Calculator*,

which then calculated the grade level of each passage. A consensus from all the seven measures was shown, giving the text sample a grade level, readability level, and reader's age.

Findings

Quantitative content analysis (number of pages, number of words, number of passages, number of sentences)

Table 1 compares the quantity of reading text between the two grades' workbooks. Book 3 has 77 pages whereas book 4 has 143 pages. Just by moving into grade 4 learners were expected to read through 66 more pages of material. Just the voluminous nature of the texts could scare off the young minds. The number of pages made the first impression to the readers more than the nuances of words per sentence.

Table 1: Comparison of the quantity of reading
material between the two grades' workbooks

Grade 3 Book 2 (Term 3 and 4)				Grade 4 Book 1 (Term 1 and 2)			
Passage no. (page)	No. words	No. sentences	Av. words per sent.	Passage no. (page)	No. words	No. sentences	Av. words per sent.
1 (2)	50	16	3.1	1 (2)	328	29	11.3
2 (6)	94	10	9.4	2 (10)	325	27	12.0
3 (10)	206	12	17.2	3 (18)	209	17	12.3
4 (16)	81	9	9.0	4 (20	297	21	14.1
5 (22)	143	15	9.5	5 (36)	296	27	10.2
6 (24)	76	7	10,9	6 (44)	304	34	8.9
7 (26)	105	11	9.5	7 (56)	140	18	7.8
8 (30)	120	16	7.5	8 (60)	86	8	10.8
9 (32)	106	10	10.6	9 (64)	113	9	12,6
10 (36)	100	17	5.9	10 (70)	260	36	7.2
11 (40)	78	9	8.7	11 (78)	346	38	9.1
12 (42)	192	21	9.1	12 (92)	122	13	9.4
13 (61)	80	7	11.4	13 (104)	396	51	7.8
14 (70)	191	10	19.1	14 (112)	117	12	9.8
				15 (114)	337	38	8.9
Total	1622	170	141	Total	3676	378	152.2
Average	116	12	10	Average	245	25	10

 Notes: No. = number; Av. = average; sent = sentences

Considering the total number of words in the passages, book 3 has 1622 while book 4 has 3676; an increase of over 200%. One wonders whether their fluency and vocabulary would also have made a correspondingly large leap. Table 1 also shows a steep rise in the passage lengths from an average passage length of 116 words in book 3 to an average passage length of 245 words in book 4. The grade 4 text's average passage length is therefore more than double the grade 3 text's average passage length, which is overwhelming for the learners. One would have expected the volume to remain constant

as there is a qualitative shift in complexity for the learners to contend with. However, what seems to remain constant is the average number of words per sentence (10) for both books which signifies that the complexity of grade 4 workbooks viz the grade 3 workbooks is more in terms of passage length rather than sentence length.

In both books, there is no deliberate effort to increase the passage lengths progressively, with the first passages being shorter than the last passages, to acknowledge the progressive development of learners' reading skills and vocabulary repertoires. However, that progression is absent in the two books. In book 3 for example, passage 2 has 94 words, passage 3 has 206 words, passage 4 has 81, and passage 5 has 43 words. One would have expected the number of words to grow progressively. The lack of progressive quantitative growth is evidently not occassioned by some passages' genres being complex enough to warrant being brevity, even when appearing towards the end of the book.

Book 3's longest passage has 206 words and it is read in the third not the fourth term, not because the issues it raises coincide with related material covered in other subject areas to allow for subject integration. The longest passage in book 4 has 396 words, almost double the longest passage in book 3. In book 4, the longest passages are also the first and second passages in the book meant to be read at the beginning of grade 4. There seems not to be any manifest criteria that justify the sequencing of the passages the way they are.

The lack of a quantitative progression is also found for the number of sentences in the different passages. In terms of length, book 4 should have had passages 8, 9 and 14 as passages 1, 2 and 3 respectively. The passages neither dealt with more difficult and unfamiliar subjects nor used more difficult terminology than the rest. They were also the shortest. The analysis revealed that there was no deliberate attempt to bring a quantitative progression in the number of sentences and words in the passages.

In terms of sentences, the longest passage in book 3 has 21 sentences compared to book 4's 51 sentences; another large leap which potentially disorients learners. Again, it was not because the grade 3 book had longer sentences, which kept the number of sentences lower than those of the grade 4 book. The lack of deliberately planned progression is manifest in that the 51 sentence long passage comes just after a 13 sentence passage.

Complexity (types of sentences, word complexity and comprehension questions complexity)

In sentence complexity, this study looks at the types of sentences that make up the passages. The numbers of simple, compound, complex and compound-complex sentences were documented to determine the complexity of the passages. Table 2 compares the sentence complexities in the two books.

For this analysis, the figures under average are used. The grade 3 book follows the pattern where most are simple sentences, followed by compound sentences, then complex and then compound complex. However, for book 4, there are more complex than compound sentences.

There are almost three times as many simple sentences as there are compound sentences in book 3 (103 compared to 35). However, book 4 has a more generous use of simple sentences (234 compared to 57 complex sentences), indicating it as easier by that measure.

Table 2: Comparison of sentence complexity/types

Grade 3 Book 2 (Term 3 and 4) Sentence type				Grade 4 Book 1 (Term 1 and 2) Sentence type				
Passage no. (page)	Simple	Com-pound	Com-plex	Com-pound complex	Passage no. (page)	Simple	Com-pound	Complex	Com-pound complex
1 (2)	11	5	0	0	1 (2)	11	9	8	1
2 (6)	7	2	0	1	2 (10)	15	5	7	0
3 (10)	10	2	0	0	3 (18)	10	2	5	0
4 (16)	5	1	3	0	4 (20)	13	3	5	0
5 (22)	6	5	4	0	5 (36)	13	6	7	1
6 (24)	4	0	0	3	6 (44)	18	6	10	0
7 (26)	4	4	3	0	7 (56)	14	2	2	0
8 (30)	12	2	2	0	8 (60)	2	1	4	1
9 (32)	8	2	0	0	9 (64)	5	0	3	1
10 (36)	8	4	3	2	10 (70)	24	2	9	1
11 (40)	7	2	0	0	11 (78)	26	6	5	1
12 (42)	14	4	3	0	12 (92)	9	2	2	0
13 (61)	3	1	3	0	13 (104)	34	8	9	0
14 (70)	4	1	5	0	14 (112)	8	2	2	0
					15 (114)	32	3	3	0
Total	103	35	26	6	Total	234	57	81	6
Aver.	7.4	2.5	1.9	0.4	Aver.	15.6	3.8	5.4	0.4

Comparing compound and complex sentences, book 3's number of compound sentences (35) exceeds complex sentences (26), whereas for book 4 compound sentences (numbering 57) are exceeded by complex sentences (numbering 81). In terms of the use of complex sentences, book 4 is more challenging, as if book 4 enabled more space for complex sentences by employing fewer compound sentences. However, comparing simple with all non-simple sentences, book 3's ratio of 1.54 (103 simple, 67 non-simple) is only slightly lower than book 4's ratio of 1.63 (234 simple, 144 non-simple). Overall, in terms of sentence types, book 4 would be only marginally more difficult to read than book 3.

Table 2 also shows that complex sentences in book 4 are found in every passage, unlike in book 3 where 6 passages do not have any complex sentences. Although totals for complex-compound sentences in both books are the same, only three passages in book 3 have them compared to six passages in book 4. This implies that the complexity of grade 4 passages increased in terms of sentence types and length. In order to comprehend texts, it is paramount that readers understand the structure of sentences when they read. The following sentence was taken from book 4 page 20:

1. He had also cut his arm and could have bled to death if the two girls had not stopped his bleeding (Book 4, p. 20).

This is an example of a complex sentence. As the extra clause, *if the two girls had not stopped his bleeding* is added to the first one, the sentence becomes a little more difficult to comprehend. This adverbial clause added has the potential to cause confusion in the English language. The sentence now becomes a conditional sentence. A conditional statement discusses known factors or hypothetical situations and their consequences. The validity of the subject of the sentence is conditional on the existence of certain circumstances, which in the case of this sentence, may be understood from the context (Sibanda & Graven, 2018). This makes the sentence more difficult to understand.

Below is another example of a complex sentence:

2. The little boy lit the stove and then, in his excitement, knocked the stove over onto the carpet (Book 4, p. 10)

Although the subject remains the same, the addition of the clause *in his excitement* interrupts the flow of the original sentence and makes the sentence a little more difficult for young readers to understand.

Other compound-complex sentences which are likely to overwhelm young readers are:

3. I'm going to have a rest, and when I see her coming, I'll run quickly and win the race (Book 4, p. 36)
4. She wished she had running shoes because her feet hurt, especially when the ground was hot (Book 4, p. 2).

Table 3 compares the word complexities in the two books. In book 3, there is no deliberate and systematic increase in word complexity in terms of the 7-plus letter words, as the book progresses. Having sixteen 7-plus letter words in a page 10 passage and only three 7-plus letter words in the last passage on page 70 (when the assumption is that learners have become more proficient in reading, language use and comprehension) demonstrates lack of deliberate planning to gradually increase the complexity of the words.

There is a significant difference in the total number of 7-plus letter words in the two books. Book 3 has 168 (10.4%) and book 4 has 417 (11.3%). Like the number of words, the number of 7-plus letter words more than doubles, although in terms of percentage the difference is slightly below 1%. Likewise, the total number of the 4-plus syllable words also differs substantially, book 3 having five 4-plus syllables (0.31%) while book 4 has 16 (0.41%), though the books differ little when considering the percentages, a difference of 0.1%. Combining the total number of 7-plus letter words and 4-plus syllable words (173 in book 1; 433 in book 2), the increase is substantial and may present a reading challenge in terms of word length. Examples of 4 syllable words from book 3 include *thermometer, vegetables* and *separately*. These are likely to be difficult to read than 1 syllable words like *have,*

there, *cook,* among many others from the same book. Examples of 4 plus syllable words from book 4 are *especially, participants, information* and *accidentally*.

Table 3: Word complexity

Grade 3 Book 2 (Term 3 and 4)				Grade 4 Book 1 (Term 1 and 2)			
Passage (page)	No of words	Words with 7 letters +	4+ syllable words	Passage (page)	No of words	Words with 7 letters +	4+ syllable words
1 (2)	50	9	1	1 (2)	328	36	2
2 (6)	94	5	0	2 (10)	325	31	0
3 (10)	206	16	0	3 (18)	209	35	2
4 (16)	81	6	3	4 (20)	297	50	3
5 (22)	143	13	0	5 (36)	296	37	0
6 (24)	76	12	0	6 (44)	304	22	1
7 (26)	105	9	0	7 (56)	140	14	1
8 (30)	120	5	0	8 (60)	86	5	0
9 (32)	106	11	0	9 (64)	113	10	0
10 (36)	100	10	0	10 (70)	260	46	2
11 (40)	78	21	0	11 (78)	346	43	2
12 (42)	192	25	1	12 (92)	122	12	2
13 (61)	80	23	0	13 (104)	396	34	0
14 (70)	191	3	0	14 (112)	117	11	0
				15 (114)	337	31	1
Totals	1622	168	5	Totals	3676	417	16
Average	116	12	0.4	Average	245	27.8	1.1

Table 4 compares the complexity of comprehension questions in the two books. There were no evaluative questions in book 1 and book 2, perhaps because the authors tried as much as they could to use only low complexity comprehension questions.

Working with the totals, book 3 had 32 out of 41 (78%) questions being literal, with inferential questions making up the other 22%; compared to book 4 where literal questions were 42 out of 58 (72.4%) and inferential questions were 27.6%. There is, therefore, a modest difference of 5.6% between inferential questions of the two books. It is interesting to note that in both books, most inferential questions are found after the first comprehension passages. We would have expected to find them in the middle or end of the books, where we assume the passages are read by learners who are now experienced in answering more complex questions. Inferential questions have responses that are indirectly stated in the passages. Examples from book 3 (page 3) are:

5. What season was it?
6. How did Ann know that it was freezing?

Table 4: Complexity of comprehension questions

Grade 3 Book 2 (Term 3 and 4)					Grade 4 Book 1 (Term 1 and 2)				
Passage (page)	No. quest.	Literal	Infer-ential	Eval-uative	Passage (page)	No. quest.	Literal	Infer-ential	Eval-uative
1 (2)	4	1	3	0	1 (2)	5	2	3	0
2 (6)	4	2	2	0	2 (10)	4	3	1	0
3 (10)	7	7	0	0	3 (18)	8	8	0	0
4 (16)	2	2	0	0	4 (20)	5	5	0	0
5 (22)	5	4	1	0	5 (36)	4	3	1	0
6 (24)	0	0	0	0	6 (44)	4	2	2	0
7 (26)	4	4	0	0	7 (56)	4	4	0	0
8 (30)	2	2	0	0	8 (60)	4	3	1	0
9 (32)	6	4	2	0	9 (64)	1	1	0	0
10 (36)	4	3	1	0	10 (70)	5	3	2	0
11 (40)	0	0	0	0	11 (78)	3	3	0	0
12 (42)	3	3	0	0	12 (92)	4	2	2	0
13 (61)	0	0	0	0	13 (104)	4	3	1	0
14 (70)	0	0	0	0	14 (112)	0	0	0	0
					15 (114)	3	0	3	0
Total	41	32	9	0	Total	58	42	16	0
Average	4.1	2.3	0.7	0	Average	4.1	2.8	1.1	0

Examples from book 4 (page 3) are:

7. Why did Mandu say the shoes were magical?
8. Find words in the first paragraph that mean
   a. very good
   b. disliked

The answers to these questions are not directly or explicitly stated in the passage. Readers are required to think about the text, read between lines and then draw a conclusion from the passage. This is what makes it difficult to answer. For learners to be able to answer inferential questions, they must think critically and understand why the text was written, although the literature shows that most South African learners cannot do this at grade 3 and grade 4 stages.

Readability formulas

The seven quantitative readability measures were applied to the 14 and 15 passages from book 3 and book 4, and each readability formula calculated the readability score for each passage. Finally, a consensus from all the seven measures was given (*Text Readability Consensus Calculator*, n. d). It gave the text sample a grade level, reading level, and reader's age.

Half or 7/14 (50%) of the passages were not even suitable for grade 3 with passage 13 rated at 7th grade. None of the other passages were suitable for grade 2 as one would have expected, especially for the first passages. It was surprising to note that only 5/15 (33%)

of the passages for book 4 were beyond the grade 4 reading level despite passage 4 being as high as 8th-grade reading level. Passage 6 and 13 were even at the 2nd-grade reading level. Again, one wonders why book 4 would have the first 4 passages rated beyond the grade 4 level and then have further towards the end of the book passages rated for grade 2 readers. This then implies that, according to readability formulas, the grade 3 workbook was the more challenging (with the reading level 4.1 instead of 3) and that the grade 4 book's readability was almost appropriately placed (at 4.3). This speaks to tensions between the findings of quantitative measures of readability, as will be apparent in the discussion section.

Table 5: Readability levels according to the *Text Readability Consensus Calculator*

Grade 3 Book 2 (Term 3 and 4)				Grade 4 Book 1 (Term 1 and 2)			
Passage no. (page)	Reading grade level	Reading level	Readers' age	Passage no. (page)	Reading grade level	Reading level	Readers' age (grade)
1 (2)	3	Very easy	9-10	1 (2)	5	Easy	4th and 5th
2 (6)	3	Very easy	9-10	2 (10)	6	Fairly easy	5th and 6th
3 (10)	5	Very easy	10-11	3 (18)	5	Easy	4th and 5th
4 (16)	5	Very easy	10-11	4 (20)	8	Fairly easy	7th and 8th
5 (22)	3	Very easy	9-10	5 (36)	4	Very easy	4th and 5th
6 (24)	4	Easy	10-11	6 (44)	2	Very easy	1st and 2nd
7 (26)	3	Very easy	9-10	7 (56)	4	Very easy	4th and 5th
8 (30)	3	Very easy	9-10	8 (60)	4	Very easy	4th and 5th
9 (32)	3	Very easy	9-10	9 (64)	5	Easy	4th and 5th
10 (36)	3	Very easy	9-10	10 (70)	4	Very easy	4th and 5th
11 (40)	6	Fairly easy	11-12	11 (78)	4	Very easy	4th and 5th
12 (42)	5	Easy	10-11	12 (92)	4	Easy	4th and 5th
13 (61)	7	Fairly easy	12-13	13 (104)	2	Very easy	1st and 2nd
14 (70)	5	Very easy	10-11	14 (112)	4	Very easy	4th and 5th
				15 (114)	4	Easy	4th and 5th
Average	4.1			Average	4.3		

Discussion

The analysis of passages showed an increased length in grade 4 passages. While Graves and Graves (2003) saw longer texts as having an advantage owing to the detail and elaboration, lengths of the passages could not be credited to elaboration as the passages hardly dealt with concepts and ideas which needed elaboration. The lengths were just caused by the writers taking long extracts from other sources (as in page 2 of book 4) and using long stories (page 78 of book 4). In book 4, giving learners long passages early in grade 4 was probably deliberate, confirming Graves and Graves' (2003) idea of long texts as an advantage for English language learners because the longer and more detailed the text is, the higher the level of comprehension.

Findings show only three passages in book 3 had compound-complex sentences compared to six passages in book 4. This implies the complexity of grade 4 passages in terms of sentence types and length. Newman (2012, p. 6) noted that "the more complex and lengthy written sentences become, the more demands are placed on students' language abilities. This extra demand can result in reading comprehension failure." This is reflected in the grade 4 English as an additional language (EAL) workbooks, where the number of complex sentences increases more than three times. Complex sentences sometimes become difficult to read and can create comprehension problems for EAL readers. It has been found that children's sentence comprehension depends on accurate decoding (Kim & Wagner, 2015).

Newman (2012, p.7) observed that English language learners "with poor reading comprehension skills may quickly become overwhelmed with sentences with embedded clauses or complex sentences of great length". Therefore, he advised that teachers should teach sentence structures to such learners so that they know exactly the type of questions they are reading. Complex sentences take longer to read because they contain more information. (Álvarez-Cañizo et al. (2015) noted that learners with weak memory may also have challenges when interpreting long complex sentences with many clauses, or where the subject of the sentences is separated from the predicate by the clauses.

Schuster and Erickson (2014) noted that words with more syllables are generally more difficult to read than words with one or two syllables. Dyrvold, Bergqvist and Osterholm (2015) noted that word length can be a source of linguistic complexity, especially when there are so many such long words as in passage 10 for book 4, in 7 plus letter words numbered 46. That words with 7 plus letters featured in the majority of passages show the potential for the words to hinder comprehension. Schuster and Erickson (2014), however, argued that some words are easy to read even if they have 4 or more syllables because they are high-frequency words, while some 1or 2-syllable words may be difficult to read because they are unfamiliar.

It was found that inferential questions in book 3 comprised 22% as compared to book 4 where inferential questions comprised 27.6%. This is a modest but important difference of 5.6%. Pretorius and Spaull (2016) observed that children struggle even with literal comprehension in the first or second language because they can barely decode the texts that they are expected to read. What more with the comprehension of inferential questions and passages?

On one hand, the quantitative measures of readability show that book 4 has very complex passages, which have potential to challenge the grade 4 readers, but on the other hand, quantitative results from the readability formulas show book 3 to be more challenging than book 4. However, both books are beyond the grade levels they have been written for, with book 3 more difficult to read. A text which is written to cater to English second language readers should be written in simple and clear language which allows them to access the text. Halladay (2012) noted that difficult texts frustrate learners, and that learners reading at frustration level recognise less than 90% of words in the passage and comprehend only 50% of the text. Although the two workbooks have passages that are at

the learners' grade levels, quite a significant number of passages in them are quite challenging to read because they are above the learners' grade levels.

Spaull (2016, p. 4) reported on a study by NEEDU in 2013, where South African grade 5 learners across rural schools were tested on oral reading fluency. It was revealed that 41% of the sample were illiterate because "they were reading so slowly that they could not understand what they were reading and 11% of the sample could not read a single English word from the passage." This report showed us how bad it can be with reading in South Africa. Hence, it is vital to match the reading materials to their readers. Giving learners complicated texts only makes matters worse.

Conclusion and recommendations

According to the quantitative findings, book 3 was more challenging for the level and book 4 was almost appropriate for the level. It also shows book 4 to be more challenging because there was a very significant increase in the volume of material read between grade 3 and grade 4. There was also a significant increase in the complexity of the language used between grade 3 and grade 4 English First Additional language workbooks. The factors that made the reading complexities at grade 4 higher were the number of words which, the length of the passages, the sentence complexities, word complexity in terms of word length and the complexity of the questions asked.

Table 6: Readability ratings from the quantitative data

Factors used to determine readability	Result (the difference between the two books)
Number of words	A significant difference (doubling)
Passage length	A significant difference
Sentence complexity	A significant difference in sentence complexity
Word complexity in terms of length	A significant difference
Complexity of questions	A significant difference
Readability formulae	Book 3 very challenging but book 4 almost appropriate for the grade

In addition to this, in both workbooks, there is no deliberate effort to increase the number of words so that the quantity of text gets progressively larger. The lengths of the passages are random, where for example one passage may be long, followed by one or two short ones, followed again by a long one. The same problem also occurs with number of sentences and number of passages. The abrupt increase in the density of the words, sentences, and passages in the grade 4 workbook may possibly be a cause of complexity and challenge for grade 4 learners, who were in the previous term reading less than half of the words and sentences they now read in grade 4.

It is recommended that authors of Department of Education workbooks strive to ensure a match between the textbooks and the reading level of their target readers. This may be facilitated by testing the texts with readability formulas or any other tools to ensure that learners get texts that are at their level. Authors also need to be deliberate and systematic

in the gradation of content by complexity, starting with the simple and moving towards the difficult ones as the books progress. It is only fair that learners are introduced to difficult passages step by step, not abruptly. The workbooks also show a sharp increase in the number of words and sentences, and authors may consider making a gradual increase in the amounts of these aspects. It is also recommended that books be piloted, and a report on quantitative and qualitative measures be provided to the DBE before it approves books. There is appreciation for the effort of the DBE in South Africa to make these workbooks available to every learner, but they may need to consider the findings from this study. It also needs to be acknowledged that despite the increase in complexity and difficulty of workbooks for grade 4, different and improved pedagogical practices may be employed by the teachers to assist in the comprehension of the texts.

References

Allington, R, L. (2012). *What really matters for struggling readers: Designing research-based programs.* (3rd ed.). Boston, MA: Pearson. https://www.pearson.com/store/p/what-really-matters-for-struggling-readers-designing-research-based-programs/P100000248662/9780137057009

Álvarez-Cañizo M., Suárez-Coalla, P. & Cuetos, F. (2015). The role of reading fluency in children's text comprehension. *Frontiers of Psychology*, 6, 1810. https://10.3389/fpsyg.2015.01810

Dyrvold, A., Bergqvist, E. & Österholm, M. (2015). Uncommon vocabulary in mathematical tasks in relation to the demand of reading ability and solution frequency. *Nordic Studies in Mathematics Education,* 20(1), 5-31. https://www.researchgate.net/publication/273483827_Uncommon_vocabulary_in_mathematical_tasks_in_relation_to_demand_of_reading_ability_and_solution_frequency/link/55145fa70cf283ee0835977d/download

Chall, J. S., Jacobs, V. A. & Burns, L. E. (1990). *The reading crisis: Why poor children fall behind.* Harvard University Press. https://www.jstor.org/stable/j.ctvjhzs0b

Collins, R. (2014). Skills for the 21st century: Teaching higher-order thinking. *Curriculum and Leadership Journal,* 12(14). https://vhsteams.files.wordpress.com/2015/10/curriculum-leadership-journal-skills-for-the-21st-century-teaching-higher-order-thinking.pdf

Department of Education (DoE) (2003). *Revised National Curriculum Statement: Overview.* Pretoria: Government Printers.

Department of Education (DoE) (2005). *National Curriculum Statement.* Pretoria: Government Printers. https://www.education.gov.za/Curriculum/NationalCurriculumStatementsGradesR-12.aspx

DBE (Department of Basic Education). *Workbooks,* 2015. http://www.education.gov.za/Curriculum/Workbooks/tabid/574/Default.aspx

Graves, M. F. & Graves, B. B. (2003). *Scaffolding reading experiences: Designs for student success.* Christopher-Gordon.

Humphreys, A. H. & Humphreys, J. T. (2013). Reading difficulty levels of selected articles in the Journal of Research in Music Education and Journal of Historical Research in Music Education. *Music Education Research International*, 6, 15-25. https://repository.asu.edu/items/20642

Halladay, J. (2012). Revisiting key assumptions of the reading level framework. *The Reading Teacher,* 66(1), 53-62. https://doi.org/10.1002/TRTR.01093

Hernandez, D. (2011). *Double jeopardy: How third-grade reading skills and poverty influence high school graduation.* Baltimore, MD: Annie E. Casey Foundation. https://eric.ed.gov/?id=ED518818

Howie, S., Venter, E. & van Staden, S. (2008). The effect of multilingual policies on performance and progression in reading literacy in South African primary schools. *Educational Research and Evaluation*, 14(6), 551-560. https://doi.org/10.1080/13803610802576775

Kasule, D. (2011). Textbook readability and ESL learners. *Reading & Writing,* 2(1), 63-76. https://hdl.handle.net/10520/EJC131508

Kim, Y. S. G. & Wagner, R. K. (2015). Text (oral) reading fluency as a construct in reading development: An investigation of its mediating role for children from grades 1 to 4. *Scientific Studies of Reading,* 19(3), 224-242. https://doi.org/10.1080/10888438.2015.1007375

Korger, H. (1992). *Handbook of type and lettering* (trans. Ingrid Li). New York: Design Press.

Lesnick J., Goerge, R., Smithgall, C. & Gwynne J. (2010). *Reading on grade level in third grade: How is it related to high school performance and college enrollment?* Chicago, IL: Chapin Hall at the University of Chicago. https://www.chapinhall.org/wp-content/uploads/Reading_on_Grade_Level_111710.pdf

Mayer, R. E. (1989). Systematic thinking fostered by illustrations in scientific text. *Journal of Educational Psychology*, 81(2), 240-246. https://psycnet.apa.org/doi/10.1037/0022-0663.81.2.240

McIntyre, B, (1996). *English news writing.* Hong Kong: The Chinese University Press.

McNamara, D. S., Ozuru, Y. & Floyd, R. G. (2011). Comprehension challenges in the fourth grade: The roles of text cohesion, text genre, and readers' prior knowledge. *International Electronic Journal of Elementary Education,* 4(1), 229-257. https://www.iejee.com/index.php/IEJEE/article/view/222

Muncer, S. J., Knight, D. & Adams, J. W. (2014). Bigram frequency, number of syllables and morphemes and their effects on lexical decision and word naming. *Journal of Psycholinguistic Research*, 43, 241-254. https://doi.org/10.1007/s10936-013-9252-8

Newman, D. (2012). *Reading comprehension and the sentence. Sentence awareness exercises for school-age students.* David Newmonic Language Resources 2010-2012. http://www.speechlanguage-resources.com/support-files/inferenceactivitiesebooksupplement.pdf

Pretorius, E. J. & Spaull, N. (2016). Exploring relationships between oral reading fluency and reading comprehension amongst English second language readers in South Africa. *Reading and Writing*, 29, 1449-1471. https://doi.org/10.1007/s11145-016-9645-9

Rubiner, B. (2016). Bright spots in the campaign for grade-level reading. *National Civic Review*, 105(2), 43-51. https://www.jstor.org/stable/10.1002/naticivirevi.105.2.0043

Sanyal, J. (2006). *Indlish: The book for every English speaking Indian.* India: Viva Books. http://www.vanguardbooks.com/browsetitle.php?isbn=8130902818&title=INDLISH

Schuster, J. & Erickson, K. (2014). Text complexity in the Dynamic Learning Maps™ Alternate Assessment System (White Paper No. 14-01). Lawrence, KS: University of Kansas Center for Educational Testing and Evaluation. https://dynamiclearningmaps.org/sites/default/files/documents/publication/text_complexity_in_the_Dynamic_Learning_Maps_alternate_assessment_system.pdf

Setati, M. & Barwell, R. (2008). Making mathematics accessible for multilingual learners. *Pythagoras*, 67, 2-4. https://pythagoras.org.za/index.php/pythagoras/article/download/68/79

Sibanda, L. (2013). The readability of two Grade 4 natural sciences textbooks for South African schools. *South African Journal of Childhood Education,* 4(2), 154-175. http://www.scielo.org.za/pdf/sajce/v4n2/10.pdf

Sibanda, J. (2017). Language at the Grade Three and Four interface: The theory-policy-practice nexus. *South African Journal of Education*, 37(2), 1-9. https://doi.org/10.15700/saje.v37n2a1287

Sibanda, J. & Baxen, J. (2016). Determining ESL learners' vocabulary needs from a textbook corpus: Challenges and prospects. *Southern African Linguistics and Applied Language Studies*, 34(1), 57-70. https://doi.org/10.2989/16073614.2016.1159521

Sibanda, L. & Graven, M. (2018). Can mathematics assessments be considered valid if learners fail to access what is asked of them? *South African Journal of Childhood Education* 8(1), a505. https://doi.org/10.4102/sajce.v8i1.505

Rubens, P. (2001). *Science and technical writing. A manual of style.* London: Routledge. https://www.routledge.com/Science-and-Technical-Writing-A-Manual-of-Style/Rubens/p/book/9780415925518

Spaull, N. (2016). *Learning to read and reading to learn.* Stellenbosch Policy Brief No. 04/2016. Research on Socioeconomic Policy (RESEP). https://resep.sun.ac.za/learning-to-read-and-reading-to-learn/

Sweet, A. P. & Snow, C. E. (Eds.) (2003). *Rethinking reading comprehension.* New York: Guilford Press.

Text Readability Consensus Calculator (n. d). My Byline Media. https://readabilityformulas.com/free-readability-formula-tests.php

Triggs, T. & Frost, D. (2015). *The school of art: Learn how to make great art with 40 simple lessons.* Wide Eyed Education: USA.

Van Staden, A. (2011). Put reading first: Positive effects of direct instruction and scaffolding for ESL learners struggling with reading. *Perspectives in Education*, 29(4),10-21. http://journals.ufs.ac.za/index.php/pie/article/download/1713/1687/

Wray, D. & Janan, D. (2013). Exploring the readability of assessment tasks: The influence of text and reader factors. *Multidisciplinary Journal of Educational Research*, 3(1), 69-95. https://dialnet.unirioja.es/descarga/articulo/4192289.pdf

Zamanian, M. & Heydari, P. (2012). Readability of texts: State of the art. *Theory and Practice in Language Studies*, 2(1), 43-53. https://doi.org/10.4304/tpls.2.1.43-53

Dr Lucy Sibanda is in the Department of Human Sciences, at Sol Plaatje University, South Africa. She holds a Masters and PhD in education from Rhodes University, South Africa. Her PhD research was on the linguistic challenges of Grade 4 Mathematics Annual National Assessments.
Email: lucy.sibanda@spu.ac.za