

Exploring Differential Item Functioning on reading achievement: A case for isiXhosa

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Interest in early childhood's cross-cultural literacy assessment has given rise to this study. Participation of different languages in the same assessment should aim to encourage linguistic equivalence, functioning equivalence, cultural equivalence as well as metric equivalence. South Africa participated in three cycles of the Progress in International Reading Literacy Study (PIRLS). For purposes of the current study, Grade Four learner responses to a literary passage in English and isiXhosa called, '*The Lonely Giraffe*', were analysed. Data was analysed by firstly providing evidence of a substantially higher mean achievement for learners who write in English than those who wrote in isiXhosa. Differential Item Functioning (DIF) showed that the items did not reflect an equal distribution for a number of individual items in isiXhosa. Subsequently, the complexities of dialects in African languages are presented by providing possible alternative translations to the problematic items. The significance of the current study is in its potential to contribute to an understanding of language complexities in large scale assessments in attempts to provide valid, reliable and fair assessment data across sub-groups.

Introduction

The aim of the study is to explore the possible effects of Differential Item Functioning (DIF) using data from the Grade Four prePIRLS South African 2011 study. The study proposes to investigate the English and isiXhosa responses to a passage aimed at assessing learners' abilities to read for literary experience, and to provide alternative translations for the literary passage in the three isiXhosa dialects spoken across three areas in South Africa, namely, from Mount Frere to Umzimkhulu, Lusikisiki, and from Mbashe to Kei river.

Prior to the first democratic elections in 1994 there were only two official languages in South Africa, namely Afrikaans and English (Shillington, 2005: 1046), but

after the 1994 elections, under the interim constitution, English, Afrikaans, isiZulu, isiXhosa, isiNdebele, siSwati, Sesotho, Sepedi, Setswana, Tshivenda and Xitsonga together received recognition as official languages (RSA, 1996). Part of the aims of the interim constitution was to provide equality in education and promote education development (RSA, 1996). Over the last decade, South Africa has been struggling to improve learners' reading literacy performance in primary schools. Studies such as the Progress in International Reading Literacy (PIRLS), and the Southern and Eastern African Consortium for Monitoring Educational Quality (SACMEQ) have shown that South Africa's primary school learners' abilities to read are much lower than those of their international counterparts (UNESCO, 2007).

South Africa participated in PIRLS 2006 for the first time, with a test that was administered in all official languages at Grade Four and Five levels (Howie, Venter, van Staden, Zimmerman, du Toit., Scherman, & Archer, 2008: 2). The scaling and the participants' achievements were depicted by using the internationally set 500 points mean and 100 standard deviation (Mullis, Martin, Kennedy & Foy, 2007: 36). The South African Grade Four learners achieved an average score of 253 (SE=4.6) and the Grade Five learners achieved an average score of 302 (SE=5.9). South Africa achieved the lowest score of all 45 participating education systems in PIRLS 2006, hence the design for PIRLS 2011 was revised, with Grade 5 learners tested only in Afrikaans and English, the two best performing languages in PIRLS 2006 (Howie, van Staden, Tshele, Dowse & Zimmerman, 2012:27). For the purpose of testing learners across the other official languages, pre-PIRLS 2011, was introduced as an easier assessment to accommodate low performing countries in which learners were still developing their reading skills (Mullis, Martin, Foy & Drucker, 2012: 29).

PrePIRLS 2011 results showed that learners who wrote the test in Afrikaans and English achieved the highest average scores in South Africa. Those who wrote the test in English achieved an average scale score of 525 (SE=9.9) and Afrikaans achieved an average scale score of 530 (SE=10.1). The three highest scoring African languages included that of siSwati with 451 (SE=5.8), followed by isiZulu with 443 (SE=9.3), and isiXhosa with 428(SE=7.4).

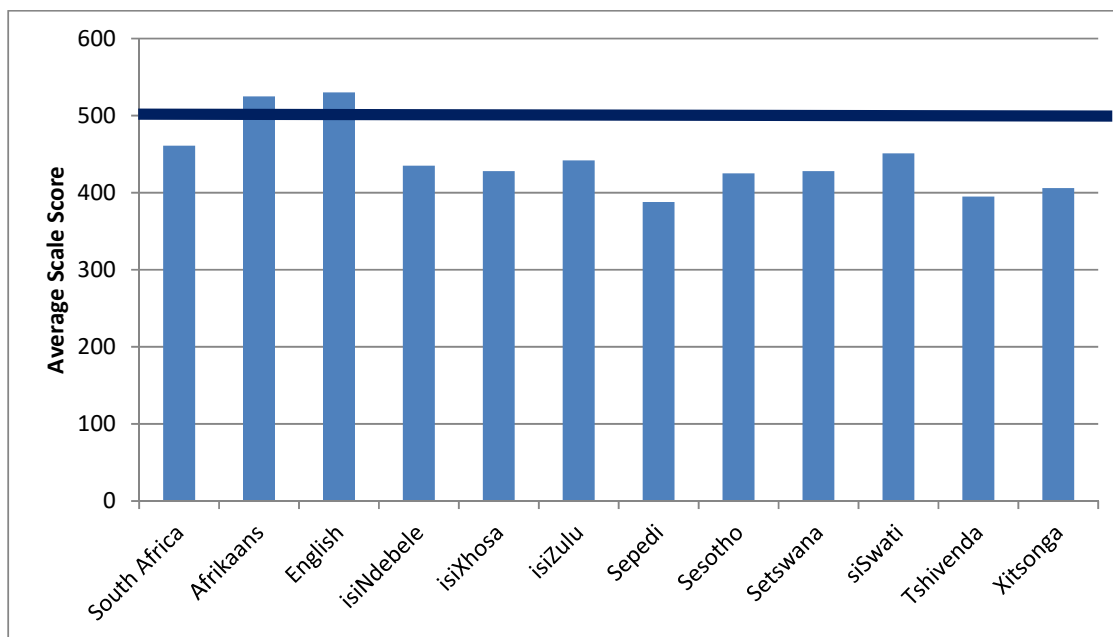


Figure 1: South African Student Performance in prePIRLS 2011 2011 by Language of the Test. Note: the horizontal line indicates the International Centre point of 500 (Sourced from Howie et al., 2012: 29).

As illustrated in Figure 1, isiXhosa was placed as fifth best performing language. This result is still disappointing, as it is still significantly lower than the international centre point of 500. Additionally, isiXhosa is the second most widely spoken language in South Africa (Census, 2011). It has to be noted that since the release of the prePIRLS 2011 results, the PIRLS Literacy 2016 results were also released, the new designation for pre-PIRLS. This study still reports on prePIRLS 2011 data, since the PIRLS Literacy 2016 data had not been available when this study was conducted.

Historical Background to isiXhosa

According to oral history (Peires, 1981: 12), the ancestors of the amaXhosa were the first group of the Nguni to migrate to South Africa, around the 13th century, from the east coast of Southern Africa. The language isiXhosa is an agglutinative tonal language of the Bantu family, which is a family group from Southern African tribes. There is a clear distinction between amaXhosa and isiXhosa speakers, the former being those who claim descent from an ancestral king named Xhosa, which is amaGcaleka (sic) and amaRharhabe of the present day (Bekker, 2003: 2). The latter isiXhosa speaking tribes are the Thembu, Mpondo, Mpondomise, Bhele, Zizi, Hlubi

and Bhaca. The isiXhosa speaking tribes have their own history but speak the language isiXhosa and came from Natal as refugees of the Mfecana (sic) wars and settled in amaXhosa land in the early 18th century (Bekker, 2003: 3). The refugees became part of amaXhosa and adopted their language and culture, hence current isiXhosa speaking groups' customs have a close commonality (Mayer, 1971: 6). Their isiXhosa dialect thus differs slightly from the original dialect spoken by amaXhosa (Bekker, 2003: 5). Due to South Africa's political history, many of isiXhosa speaking people were pressured to leave their tribes and homelands and seek better employment in urban areas such as Johannesburg, Cape Town and the industrial hubs of Port Elizabeth, Kimberly and Rustenburg (Shillington, 2005: 1046). They settled in these urban and industrial cities where they integrated with English, Afrikaans and other African language speakers. Due to migrant labour and their nature of work they often spoke the employer's language (Peires, 1981: 12) and so there were new isiXhosa dialects that had developed from integration and migrant labour.

It is important to note that most development of African languages happened after 1910 (Poulos & Msimang, 1998: 6). The language development included translations, terminology as well as dictionaries and these works are still relevant in the 21st century. The earliest record of written isiXhosa lexicography dates back to 1776 through a dictionary titled Appendix by Sparrman (Mtuzze, 1992: 167). The author Andrew Sparrman, a natural scientist, compiled a short isiXhosa dictionary containing numerals, nouns, adjectives and verbs (Nkomo & Wababa, 2013: 2). The list of words in the dictionary differs slightly from those used today. Between then and the early 2000's, there has been evidence of lexicography work done through the *Greater Dictionary of isiXhosa (GDX)* at the university of Fort Hare. It goes without saying that the dictionary developed rapidly to include standardised isiXhosa terms and concepts as much as possible. Subsequently, isiXhosa has proven to have the longest history of lexicography development than any other African language in South Africa (Nkomo & Wababa, 2013: 2).

In spite of the fact that isiXhosa has the longest lexicography history, Nkomo & Wababa (2013: 4) continue to pose the question of whether current dictionaries could be updated to suit the more complex dialects, among others on issues of current lexicographic needs amongst isiXhosa speaking communities in different regions. Like most African cultures, there are several isiXhosa-speaking communities in South Africa. The communities on many occasions is grouped according to tribes such as

Bhaca, Mpondo, Hlubi, Gcaleka, Ngqika, Thembu, Mfengu, Mpondomise, Xesibe, Cele, Ndlambe and Ntlangwini, which is predominantly spoken in the Eastern and Western Cape provinces. The different communities also associate with specific dialects of isiXhosa (Nyamende, 1996: 202), but with dialect variations particularly distinctive in the former homelands, Transkei and Ciskei.

The first missionary to settle amongst amaXhosa people was Theodorus van der Kemp, from the London Missionary society in 1799 with Chief Ngqika and his people along the Tyume River (Nyamende, 1996: 203). In this way, the Ngqika dialect was learnt and written down by the missionaries. The interaction between the natives and missionaries followed the translation of the Bible. As far as one can tell, but a highly debatable point, is that the Ngqika dialect was then taught in missionary schools in the former Transkei. The pioneering processes lead the Ngqika dialect to be seen today as the ultimate standardised isiXhosa language. With the further writing up of the language, isiXhosa included not only the Ngqika but also the Ndlambe and Thembu dialects (Nyamende, 1996: 204). The other dialects spoken in the regions of the Mpondo, Bhaca, Hlubi, Mpondomise, Xesibe, Cele and Ntlangwini were regarded as independent languages of the Xhosa cluster. Meaning, these dialects are not considered part of isiXhosa language. The Ngqika, Thembu and Ndlambe dialects formed the official written and taught isiXhosa. Additionally, in many cases, the “official” dialects enjoyed higher status among Xhosa speakers in other regions.

Gxilishe (1996: 2) raises a valid point that questions possibilities to use the learners’ non-standard dialects in the classroom. The author/researcher explains that the two strong arguments for using one standard dialect in classrooms would on one hand be that it might be a useful bridge to the standard language. On the other hand, the use of home language dialects has shown to be to the satisfaction of many, beneficial in promoting the child’s self-image and sense of belonging (Gxilishe, 1996: 2).

Standardisation of isiXhosa

If by implication a language is a sum of many of its dialects, a general bias to argue against is that some dialects are not the ‘proper language’ or are even unscientific (Mesthrie, 2002: 11). Lodge (1995: 16) address the issue of dialect and standard language as illustrated in figure 2:

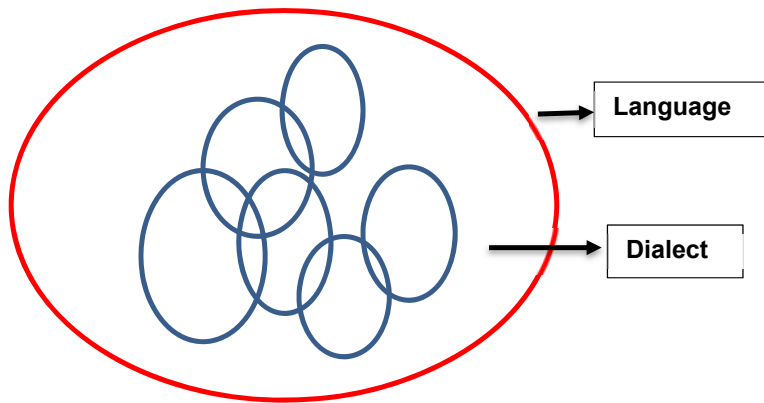


Figure 2: *Dialectal issues in isiXhosa (Lodge, 1995: 16).*

Figure 2 demonstrates Lodge’s (1995) viewpoint on the standardisation of a language. He goes on to explain that the standard language is simply a dialect along with all the other dialects within that specific language cluster. Everybody speaks a dialect, even if it is the standard language. The current study re-illustrates Lodge’s (1995) standardisation framework to determine what standardisation looks like in isiXhosa language in addition to how Nyamende (1996: 202) and Gxilishe (1996: 2) understand the issues of isiXhosa dialects:

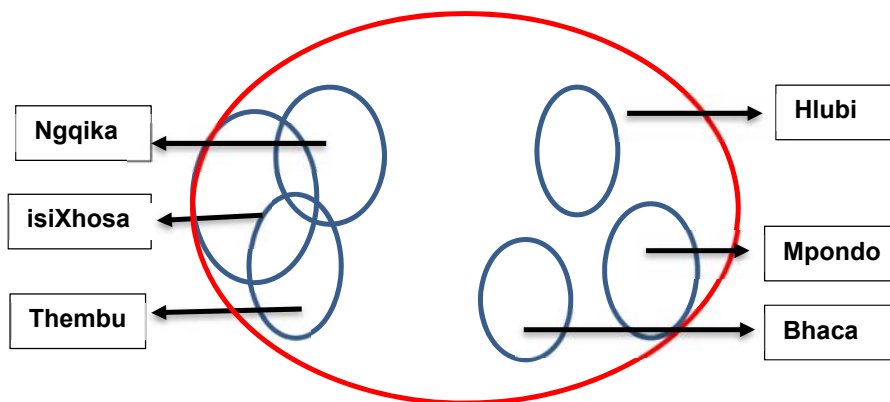


Figure 3: *A reconstructed presentation of the dialectal issues of isiXhosa*

Figure 3 aims to point out how only two isiXhosa dialects are recognised as part of the official isiXhosa (Ngqika and Thembu). The other three dialects also form part of isiXhosa language group, but are not regarded as official, non-standard or considered “proper” isiXhosa. There are many other isiXhosa dialects, however the focus of this article only seeks to explore the three dialects isiHlubi, isiMpondo and

isiBhaca. These dialects share many similarities along with differences in terms of morphology, vocabulary and terminology. On policy, regardless of what dialect may be spoken at home or in the community, the Curriculum Assessment Policy Statement (CAPS) standards and objectives are those of the “official” isiXhosa. The obvious reasons for this official version would firstly, be to centralise the teaching of the language. Secondly, the practicality of accommodating one version of isiXhosa needs consideration as opposed to several dialects. Lastly and most importantly for testing purposes, a standardised isiXhosa assessment would be optimal. To enhance understanding about the dynamics to what extent these dialects differ to isiXhosa, an additional illustration by Nyamende (1996: 205) is presented below to substantiate to what extent dialects differ from the “official” isiXhosa. As out dated as the source is, it points to the issue of a still under-researched topic of dialects in South African languages.

Table 1: Comparing isiXhosa and isiBhaca terms as illustrated in Nyamende, 1996: 205

English	isiXhosa	isiBhaca
Mat	Ukhukho	isicamba
Hare	Umvumndla	Unoqwaja
To speak	Ukuthetha	Ukubhobha

Table 1 shows a few words that are often used in children’s storybooks in English, the translation in isiXhosa as well as what the term is in isiBhaca. IsiXhosa and isiBhaca column have completely different vocabulary to the English term. This means for a learner whose home language is isiBhaca the term *mat* at home is referred to as *isicamba* however, at school it is taught as *ukhukho* when making use of isiBhaca dialect. By implication, a learner who completes a paper in isiXhosa, but whose home language is isiBhaca, if not taught the “official” version of isiXhosa, may possibly be confused and unable to conceptualise the meaning of the low frequency words as presented in the example above. Although only three terms have been presented, in Nyamende (1996: 205) a detailed analysis of the differences between isiXhosa and isiBhaca is explored. The author further concludes that isiBhaca also differs in vocabulary from isiXhosa, meaning that the dialect goes as far as offering different words to express the same meaning in isiXhosa.

Table 2 illustrates differences within isiXhosa when using isiMpondo dialect:

Table 2: Comparing isiXhosa and isiMphondo terms as illustrated in Nyamende (1996:205)

English	isiXhosa	isiMpondo
I am going	Ndiyahamba	Ndriyahamba
An old man	Indoda endala	Indroda endrala
A girl	Intombi	Intrombi

Unlike isiBhaca, isiMpondo seems to have different phonemes to isiXhosa. Looking at one example shown above, *Ndiyahamba* in isiXhosa is *Ndriyahamba* in isiMpondo. The pronoun 'I' in isiXhosa is expressed as *n-d-i* whereas in isiMpondo is *n-d-r-i*, the additional letter is *r*. One could surmise that, consequently, the different spelling and or sound could possibly affect the meaning of the word. The question here is to what extent the phoneme has a possible effect on learner performance. Lastly, Table 3 illustrates differences within isiXhosa in the presence of the Hlubi dialect:

Table 3: Comparing isiXhosa and isiHlubi terms as illustrated in Nyamenda (1994:205)

English	isiXhosa	isiHlubi
This clay	Oludongwe	Elidongwe
My foot	Unyawo lwam	Inyawo lam
At night	Ebusuku	Ekesuku
A hole	Umngxuma	Isigodi

Table 3 displays a few popular terms used in children's books in English, the translations in isiXhosa as well as isiHlubi. Like isiMpondo, isiHlubi dialect differs in the first person prefix and has different vocabulary for some words from isiXhosa. For example, 'This clay' in isiXhosa is '*O-I-u dongwe*' and in isiHlubi is '*E-I-i dongwe*'. Instead of using 'o' in isiMpondo it is replaced by 'e'. Consequently, the different vocabulary and prefix can mislead a learner in understanding a meaning of a word. Furthermore, one has to ask to what extent the misunderstanding of the text could create item bias for learners from the isiHlubi region.

Since the work of Nyamende in 1996, little has been published on the topic of different isiXhosa dialects. On the one hand, standard isiXhosa is generally associated with those who have had a Christian or formal education, while on the other hand there are numerous dialects which are associated with narrow-mindedness, ignorance and

backwardness amongst amaXhosa (Nyamende, 1996: 204). The aim of this study therefore is firstly to investigate possible evidence of Differential Item Functioning (DIF) from one of the pre-PIRLS 2011 passages, which were translated from English into isiXhosa, administered across in all isiXhosa regions regardless of dialect differences. Secondly, the aim of this study is to explore teachers' literacy practises from different dialect regions by scrutinising the problematic items that emanated from the DIF analysis. By providing the selected teachers the problematic isiXhosa items, the expectation is to gain some insight on the extent to which the teachers use their dialects (and possibly unfamiliar words from the standard isiXhosa dialect as they appear in the prePIRLS 2011 passage) in their isiXhosa reading literacy classrooms.

Research questions

Three research questions guide the current study, namely:

1. What is the difference in the reading achievement between English and isiXhosa Grade Four pre-PIRLS 2011 passage *The Lonely Giraffe*?
2. To what extent can the differences explained by providing evidence of bias in differential Item Functioning (DIF) be found between English and isiXhosa Grade Four pre-PIRLS 2011 response to a reading passage *The Lonely Giraffe*?
3. To what extent could any of the other isiXhosa dialects have provided alternative forms of the items to the passage *The Lonely Giraffe*?

Methods

The nature of the study is a quantitative secondary analysis making use of a non-experimental design using existing data. For the purpose of this study, the focus was on *The Lonely Giraffe*, a literary passage with a total of six free response questions and nine multiple choice questions. The passage is a story about a group of animals in a bushveld setting and how a lonely giraffe acts as a rescuer during a crisis to secure his place among the other animals (van Staden & Howie, 2014: 11). For the purpose of answering question 1, average achievement was used to identify and report differences in reading literacy achievement between English and isiXhosa *The Lonely Giraffe* responses. The IEA's International Database Analyser (IDB Analyser) software was used to report the descriptive statistics, a plug-in for the Statistical Package for

the Social Sciences (SPSS) developed by the IEA to combine and analyse data from large scale data sets.

To answer question 2, Rasch Item Response Theory (IRT) was used to analyse the pre-PIRLS 2011 South Africa data. IRT works as a one-parameter model that measures learners' probability to answer a test item correctly (Smit, 2004: 392). The probability of a learner being able to answer a test item depends on the item bias. The aim of the analyses would be to establish whether the item functions differently for learners of different abilities or groups. According to Smith (2004: 392), item bias is associated with differential item functioning (DIF), that is, the level of difficulty of a test item depends on some characteristics of a group (Smith 2004: 394). DIF is used when individuals of different backgrounds are tested and has an assumption that individuals have the same proficiency but different probabilities to answer the question correctly. In this particular study the probability of answering the question correctly was dependent on the English and isiXhosa group differences, therefore differences in language. According to Gierl and Khaliq (2001: 165), language differences can be associated with different probabilities of a learner answering an item correctly. RUMM2030 software was used to analyse the data.

To answer research question 3 the problematic items, as identified by the DIF results, were given to three Grade 4 isiXhosa teachers. These teachers were from three isiXhosa regions, namely Mount Frere to Umzimkhulu, Lusikisiski, and Mbashe to Kei River to translate into isiXhosa. This stage of the data analysis was to discover whether there were dialect differences in isiXhosa across the problematic items to provide possible language bias explanations.

Sample

Research question 1 and 2 were answered by analysing the prePIRLS 2011 achievement data. A total of 15 744 learners participated in the prePIRLS 2011 in South Africa, of whom 2 205 were tested in English and 1 090 in isiXhosa. For this study, achievement data from responses to 'The Lonely Giraffe' from 819 learners was analysed, comprising 539 learners who completed the selected passage in English and 279 learners who completed the selected reading passage in isiXhosa. Due to the matrix design of passages across the achievement booklets, not every learner who participated in prePIRLS 2011 completed every passage, hence the difference in numbers of learners from the total sample per language to only those who responded

to *The Lonely Giraffe*. The passage appears in test booklets three, four and twelve. Table 4 provides information on each of the items from the passage in terms of item format, maximum score and process of comprehension associated with the item:

Table 4: Item summary for ‘*The Lonely Giraffe*’ and processes of comprehension.

Item	Item format	Maximum score	Process of comprehension
1	Constructed response	1	Focus on and retrieve explicitly stated information
2	Multiple choice question	1	Focus on and retrieve explicitly stated information
3	Constructed response	1	Focus on and retrieve explicitly stated information
4	Multiple choice question	1	Focus on and retrieve explicitly stated information
5	Multiple choice question	1	Focus on and retrieve explicitly stated information
6	Multiple choice question	1	Making straightforward inference
7	Multiple choice question	1	Making straightforward inference
8	Not administered		
9	Multiple choice question	1	Focus on and retrieve explicitly stated information
10	Multiple choice question	1	Making straightforward inference
11	Constructed response	1	Making straightforward inference
12	Multiple choice question	1	Focus on and retrieve explicitly stated information
13	Constructed response	1	Examine and evaluate content, language and textual elements
14	Constructed response	1	Focus on and retrieve explicitly stated information
15	Constructed response	1	Interpret and integrate ideas and information

Research question 3 was answered by asking isiXhosa first language speaking teachers from specific dialect areas to scrutinise problematic items that resulted from the DIF analysis. The teachers were on Foundation Phase in their respective schools and have more than five years of teaching experience in the Intermediate Phase classrooms. Teacher A was from between Mount Frere and Umzimkhulu, an area that predominantly speaks isiBhaca dialect. Teacher B was from Lusikisizi, an area where isiMpondo is mostly spoken, and Teacher C was from the Mbashe area where

isiHlubi is mostly spoken. The teachers were asked to provide possible alternatives or comment on the translations to these three items based on what they could have looked like in their dialects.

Results

The main research question of the study is “*What is the difference in reading achievement between the English and isiXhosa Grade Four pre-PIRLS 2011 passage ‘Lonely Giraffe’?*” The total score learners could obtain for this passage was 14. The mean score obtained by learners who answered questions to the passage in English was 7.22 and for isiXhosa it was 4.08. This places the overall average percentage score for the English learners at 48.1% and 27.2% for learners who responded to the passage in isiXhosa. As percentage, learners who wrote the passage in IsiXhosa achieved a considerably lower score than English. Table 5 presents the percentage of learners across the two sub-groups that obtained individual items correctly.

Table 5: Number and percentage of students who answered items in English and IsiXhosa correctly

Item No	English = 539 Students			IsiXhosa = 279 Students		
	N Completed	N Correct	% Correct	N Completed	N Correct	% Correct
Item 1	531	411	76.3	257	123	44.1
Item 2	517	389	72.2	235	125	44.8
Item 3	530	406	75.3	246	139	49.8
Item 4	518	234	43.4	228	58	20.8
Item 5	504	296	54.9	224	43	15.4
Item 6	520	310	57.5	229	122	43.7
Item 7	517	325	60.3	225	103	36.9
Item 9	515	382	70.9	221	122	43.7
Item 10	512	358	66.4	218	106	38.0
Item 11	504	265	49.2	216	59	21.1
Item 12	499	60	11.1	220	41	14.7
Item 13	517	221	41.0	230	44	15.8
Item 14	511	284	52.7	224	56	20.1
Item 15	507	257	47.7	218	67	24.0

The second research question asked: to what extent the differences in achievement can be explained by providing evidence of bias in Differential Item Functioning (DIF) between English and isiXhosa Grade Four pre-PIRLS 2011 response to a reading passage ‘*The Lonely Giraffe*’.

Table 6 presents an overall DIF analysis summary of the data, consisting of an ANOVA test, which includes a person factor analysis of all 14 items in the passage. The ANOVA is conducted mainly for two purposes, firstly to compare mean scores of two independent groups and secondly to test a null hypothesis (Maree, 2015: 297). In this study, the two independent groups refer to English and isiXhosa language sub-groups. The null hypothesis states that the English mean score is equal to the isiXhosa mean score ($\mu_{\text{English}} = \mu_{\text{isiXhosa}}$). If the null hypothesis is untrue the alternative hypothesis is accepted, which states the English mean score is not equal to the isiXhosa mean score ($H_a = \mu_{\text{English}} \neq \mu_{\text{isiXhosa}}$).

Table 6: DIF Summary for 'The Lonely Giraffe'

Item	Item format	Mean Squared	F-ratio	p-value
1	Constructed response	9.11	13.269	0.000304
2	Multiple choice	3.89	4.523	0.033798
3	Constructed response	0.15	0.276	0.599406
4	Multiple choice	0.47	0.433	0.510578
5	Multiple choice	21.57	20.895	0.000000
6	Multiple choice	22.33	18.503	0.000013
7	Multiple choice	2.72	2.784	0.095688
9	Multiple choice	0.03	0.032	0.859100
10	Multiple choice	0.44	0.565	0.452536
11	Constructed response	0.64	0.783	0.037657
12	Multiple choice	0.84	1.342	0.247188
13	Constructed response	0.36	0.306	0.580223
14	Constructed response	5.43	7.633	0.005902
15	Constructed response	0.57	0.852	0.356362

Table 6 presents the results of each item for: 1) compared mean scores between English and isiXhosa (Mean squared); 2) the f-value, which is the expected equal score under the null hypothesis testing (f-ratio) and: 3) the p-value, which is the probability value used to quantify the statistical significance of evidence. The statistically significant results at 5% level are highlighted in grey. These items are significant because the p-values are < 0.05 and therefore present strong evidence against the null hypothesis. This results in the null hypothesis for items 1, 2, 5, 6, 11

and 14, to be rejected. Additionally, these items are also reported in terms of non-uniform DIF where the ability differences in the responses to items are inconsistent among the groups (Andrich & Hagquist, 2012: 388). The small p-value (< 0.05) is also able to infer in a DIF analysis that the item responses are not the same between the English and isiXhosa language sub-groups. The small p-value in DIF between the two groups are correspondingly interpreted as an existence of some discrimination in the items. For further analysis of the non-uniform items identified in Table 6, an item-by-item DIF was conducted for items 1, 2, 5, 6, 11 and 14. These items showed some item discrimination between the two languages. However, items 1, 2 and 5 proved to be problematic based on their Item Characteristic Curves (ICC's) and provided evidence of DIF between the English and isiXhosa sub-groups of Grade 4 learners who responded to these items.

Item 1 is a constructed response item that measures learners' ability to focus on and retrieve explicitly stated information. Below, the item, as it appeared in prePIRLS 2011, reads both in English and isiXhosa as:

1. What did the animals talk about every morning?
1. Zazithetha ngantoni ntsasa nganye izilwanyana?

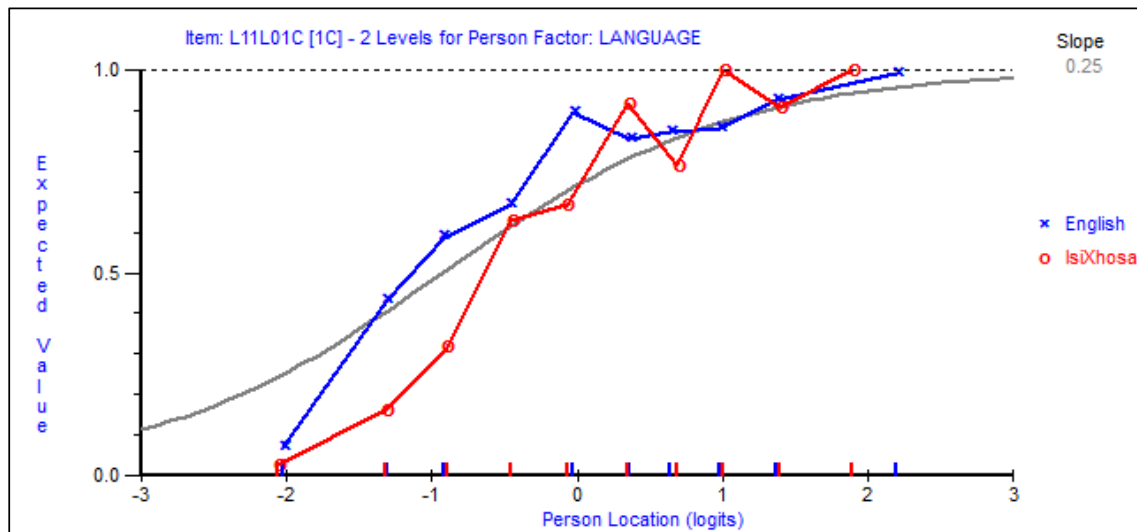


Figure 4: Item 1 characteristic curve

Figure 4 illustrates the ICC graph for English (blue) and isiXhosa (red) language sub-group responses to item 1 as well as the IRT model (grey). Both English and isiXhosa sub-groups at -2 person location are below the model curve, which means the learners in the -2 ability scale had found item 1 difficult. The English sub-group follows a similar pattern as the model curve, between -2.5 and 0.7 person location above the model curve. When a sub-group ICC is above the model, this means the probability to respond to the item correctly was higher than the expected value indicated in the model curve. IsiXhosa lower class interval (between points -3 and 0 on the x-axis of the graph) is below the model (grey), which reveals that the item was more challenging for learners who were tested in isiXhosa.

Item 2 was a multiple-choice question, the process of comprehension that was measured was to focus on and retrieve explicitly stated information. The item was presented in both English and isiXhosa in prePIRLS 2011 as follows:

2. Why didn't anyone listen to the giraffe?

He did not wait his turn to speak.

He spoke too quietly to be heard.

He was too tall.*¹

He was not friendly.

2. Kwakutheni kwakungekho silwanyana siyimamelayo indlulamthi?

Yayingalindeli ithuba layo lokuthetha.

Yayithethela phantsi, ingvakali.

Yayinde kakhulu.*

Yayingenabubele.

¹ *Indicated the correct answer for the Item

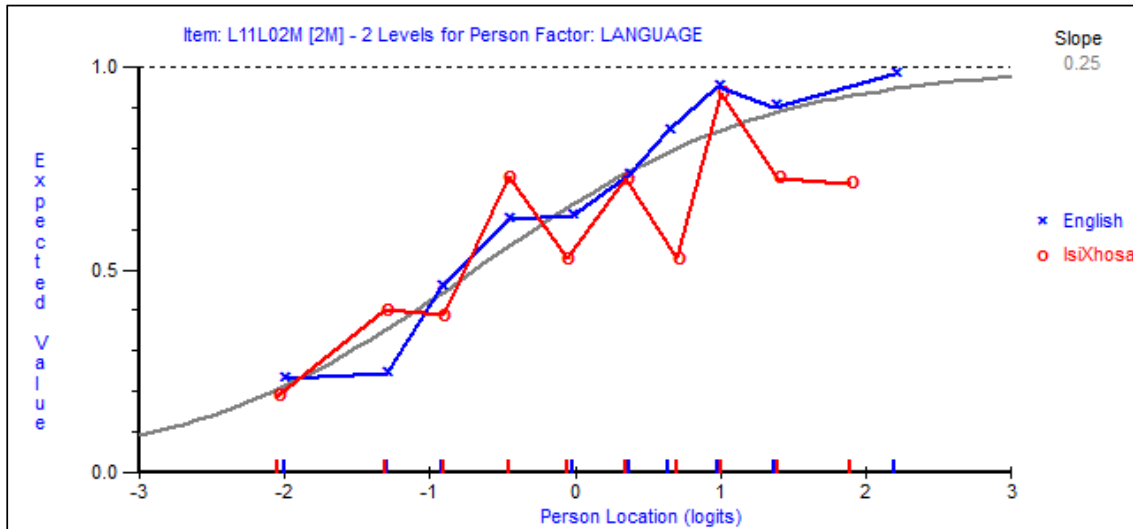


Figure 5: Item 2 characteristic curve

Figure 5 points out that item 2 for both English and isiXhosa is inconsistent. For the English sub-group, the lower-class interval (between points -2 and -1.7 on the x-axis of the graph) is below the model curve and isiXhosa curve. The curve implies that the learners between -2 and -1.7 person location English sub-group found the item more difficult than those who completed the passage in isiXhosa. The English learners on person location was between -1 to -0.4 and 0.6 to 1.3 who experienced the item as less difficult. The person locations' curve is above the model curve. IsiXhosa sub-group curve is inconsistent through the different person location points. In person location -1.8 to -1.3 and -1.1 to -0.9, the curve is above the model curve and the English sub-group curve, which means the item was less challenging for these particular learners. However, IsiXhosa learners within the upper-class intervals (between points 0 and 3 on the x-axis) found the item considerably more difficult than the English sub-group. IsiXhosa curve in the upper-class intervals is considerably lower than the model curve and the English curve. The results in figure 4's item graph characteristics curve can be explained as item discrimination towards the learners who completed the passage in isiXhosa in upper class intervals.

Item 5 was a multiple-choice question, aimed at the process of comprehension to focus on and retrieve explicitly stated information. The item was presented in the prePIRLS 2011 assessment in both English and isiXhosa as follows:

5. What did the giraffe stop doing over the summer?

wandering off

frightening the birds

appearing in the treetops

speaking to anyone*

5. Yintoni eyayeka ukuyenza indlulamthi ngexesha lehlobo?

ukuhamba

ukoyikisa iintaka

ukuvela phezulu emithini

ukuvela phezulu emithini*

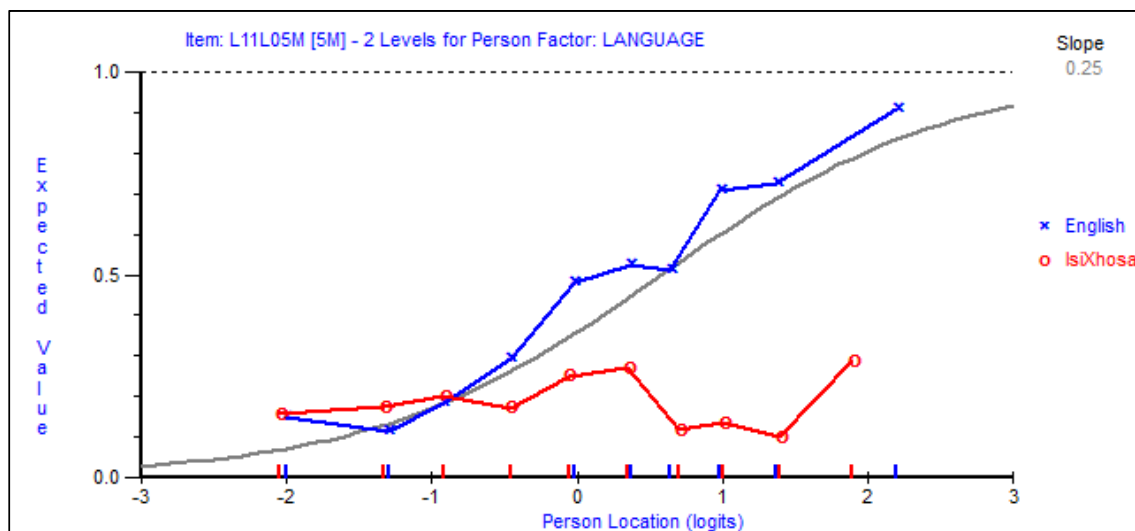


Figure 6: Item 5 characteristic curve

Figure 6 shows the ICC for item 5 in the passage between English and isiXhosa sub-groups. Both begin at the same point of -2 person location with the obtained value of 0.18 and the obtained value above that expected. The significance of this point is that for learners situated at -2 person location the item was easier than predicted by the model curve (grey). On the one hand, the English curve follows the pattern and mostly is above the model curve. The curve can be interpreted to say that person location -0.5 to 2 (upper class interval) experienced the item as easier than expected. On the other hand, isiXhosa curve decreases below the model curve. IsiXhosa curve

means that the obtained values were much lower than the expected ones, which indicated the learners had trouble in answering the item. Additionally, because the English curve proved easier and isiXhosa more difficult, it can be concluded that item 5 discriminated against isiXhosa language sub-group.

Based on evidence of DIF, question 3 asks, to what extent any of the other isiXhosa dialects could have provided alternative forms of the items to the passage, ‘*The Lonely Giraffe*’. Teachers from the three dialect regions scrutinised the problematic items and indicated the following:

Teacher A indicates that the word “*talk*” (English) in the prePIRLS 2011 isiXhosa item 1 is “*thetha*” (isiXhosa). She refers to the word “*talk*” as “*bhobha*” (isiBhaca) which is the word used in her dialect. Teacher A therefore, provides an alternative word, which she explains as commonly used as a synonym for the verb “*talk*”, the word she uses in her classroom and a word that refers to “*talk*” in their dialect spoken in their community. Teacher A also shows a different way to spell “*animals*” (English) “*izilwanyana*” (isiXhosa) in her response, as illustrated by the description below:

<i>Original item</i>	<i>Teacher A</i>
<i>izilwanyana</i>	<i>Tilwanyana</i>

Teacher A indicates that, in the isiBhaca dialect, the phoneme ***izi*** does not exist, which indicates plurality, but instead uses a different prefix and phoneme that is ***ti***. This means that if learners have not been taught prefixes well enough it could cause confusion in the text.

Teacher B made use of different prefixes for the word “*morning*” (English) in isiXhosa “*ntsasa*” prePIRLS 2011 item 1 in the following way:

<i>Original item</i>	<i>Teacher B</i>
<i>ntsasa</i>	<i>ngetsatsa</i> .

According to teacher B, *nge* is a morpheme she uses in her classroom to emphasise, “*for every morning this is what happens...*”. Teacher B also points out that, using *ngetsatsa* is not necessary linked to her dialect, but a prefix that is used for emphasis and in her opinion is regularly used in her community.

Lastly, teacher C used a different word (or synonym) to emphasise the notion of “*every morning this is what happened...*” in the following manner:

<i>Original item</i>	<i>Teacher C</i>
Ntsatsa nganye	Qho kusasa

Teacher C suggests that, instead of using, “*ntsatsa nganye*”, she would present it to her learners as, “*qho kusasa*”. Teacher C supported her phrasing as being cognitively appropriate for Grade Four learners in her classroom.

The responses from the teachers is a combination of dialect vocabulary used in the classroom as well as the use of low frequency words used in item 1 as presented by the prePIRLS 2011 passage. Additionally, the representation of the item structure is an alternative way the teachers felt the item could have been asked in order to be more comprehensive for the learners in their respective classrooms. Lastly, teachers’ comments were based on the dialect use of high frequency words that are commonly spoken in their specific areas.

In terms of item 2, the following were identified:

Table 7: Teacher responses to Item 2

PrePIRLS 2011 Item 2 English	PrePIRLS 2011 Item 2 isiXhosa	Teacher A (isiBhaca)	Teacher B (isiMpondo)	Teacher C (isiHlubi)
<i>Why didn't anyone listen to the giraffe?</i>	<i>Kwakutheni kwakungekho silwanyana siyimamelayo indlulamthi?</i>	Yini eyenta kungabiko tilwanyana timamela indlulamthsi?	Kwakutheni kungekho silwanyana esiyimamelayo indlulamthi?	“Kutheni le nto kungazange kube silwanyana siyimamelayo indlulamthi?”

Teacher A rephrased the entire sentence and spelled some words differently from the original item 2. For example:

Original Item	Teacher A
Silwanyana	Tilwanyana
Siyamamelayo	Timamela
Indlulamthi	Indlulamthsi

Teacher A explains the differences in spelling as dialect phonemes. Further, she clarified that in her dialect the letter “S” is non-existent and replaced with the phoneme “TI”. The phoneme “THI” is pronounced and spelt as “THSI”. Additionally, she mentioned that usually learners in foundation phase struggled with the differences in the pronunciation of these phonemes. In the rephrasing of the sentence, teacher A provided an alternative sentence construction and explained it by saying it was a “better translation...” and not too complex for learners in Grade Four. Teacher A pointed out a constant struggle in teaching “standardised” isiXhosa in dialectal isiBhaca, by which she expressed that in early literacy years she experienced having to teach “standardised” isiXhosa in her dialect as a form of code switching in her classroom.

Teacher B removed a prefix of the word in the example below:

Original item	Teacher B
Kwakungekho	_____kungekho

Teacher B removed the prefix of “*kwakungekho*” to “*kungekho*”. The motivation here is that she has taught her learners when there was the same prefix in two words after one another, for example as illustrated in the isiXhosa prePIRLS 2011 “*Kwakutheni kwakungekho*”. To remove the prefix of the second word, an example from teacher B’s response “*Kwakutheni kungekho*” is provided. She noted that in her dialect that makes the most sense by removing the prefix of the second word. Teacher C commented on first part of the item in the following way:

Original item	Teacher C
Kwakutheni kwakungekho	Kutheni le nto kungazange kube

Teacher C rephrased the first part of the item from ‘*Kwakutheni kwakungekho*’ to ‘*Kutheni le nto kungazange kube*’. Teacher C’s justification for the change is that the sentence of the original item would be at a difficult level for the learners in her Grade Four classroom, quoting from the field note: ‘...lentoni, sisXhosa esinzulu, apha asifiki apha...’ translates to ‘...this is deep Xhosa, here!!, we do not even get there...’.

The teachers’ responses presented a mix between dialect use in classroom and the use of low frequency words or unfamiliar sentence structures. Teacher C in

particular felt that the item was written in “too” formal isiXhosa, which the learners in her classroom were not familiar with and would struggle to understand at their level. When scrutinising the possible versions of item 5, the following was identified:

Table 8: Teacher responses to Item 5

PrePIRLS 2011 Item 5 English	PrePIRLS 2011 Item 5 isiXhosa	Teacher) A (isiBhaca)	Teacher B (isiMpondo)	Teacher C (isiHlubi)
What did the giraffe stop doing over the summer?	Yintoni eyayeka ukuyenza indlulamthi ngexesha lehlobo?	Yintoni eyayeka ukuyenta indlumathsi ngexesh a lehlobo? “The correct answer which was option (d) was not included. Distractor (c) and (d) we the same.	Yayeyeka ukwenzani ngexesha lehlobo indlulamthi?	<i>Yintoni eyayeka ukuyenza indlulamthi ngexesha lehlobo?</i>

Similar to item 2, teacher A spelled some of the words slightly differently from the original item. For example:

<i>Original item</i>	<i>Teacher A</i>
Ukuyenza	Ukuyenta
Indlulamthi	Indlumathsi

Similar to items 1 and 2, the teacher explained that this is a dialect pronunciation and the learners in Grade Four battle with the differences from “standard” isiXhosa and what the learners know to be their home language isiBhaca. The phoneme ‘**za**’ in isiXhosa is pronounced and spelled as ‘**ta**’ in isiBhaca. Similar to items 1 and 2 the phoneme ‘**thi**’ in isiXhosa is pronounced and spelled as ‘**this**’ in isiBhaca. Teacher A also mentioned that the correct answer for this item was not even one of the distractor options. Teacher A said: *‘The correct answer which was option (d) in the English version, was not included in the isiXhosa version. Distractor (c) and*

(d) are the same this could be a mistranslation error'. This finding implies that item 5 could have been more difficult for isiXhosa sub-group because the correct distractor was not provided according to teacher A.

Teacher B rephrased the entire sentence to:

<i>Original item</i>	<i>Teacher B</i>
<i>Yintoni eyayeka ukuyenza</i>	<i>Yayeyeka ukwenzani</i>
<i>indlulamthi ngexesha lehlobo?</i>	<i>ngexesha lehlobo</i> <i>indlulamthi?</i>

Teacher B's explanation for rephrasing the sentence was that the original item would be too challenging for learners in her classroom. Teacher B highlighted that at Grade Four level the learners have not yet grasped the sentence complexity of 'standardised' isiXhosa. Teacher C simply stated that the original item was appropriate for Grade Four learners in her classroom and had no comments.

For item 5, the pattern of using a dialect to teach the 'standardised' isiXhosa is evident. In addition, teacher B felt strongly about the level of difficulty of the item in reference for the learners in her classroom. Surprisingly, teacher C had no comment to this particular item.

Discussion

This study aimed to explore any evidence of DIF in the same passage, '*The Lonely Giraffe*' from prePIRLS 2011. Even with minimal evidence of DIF and no statistically significant differences between the sub-groups, context was needed to investigate the few items that proved to be problematic. Erikan (2002: 199), Gierl and Khaliq (2001: 187), and Ercikan, Gierl, McGreith, Puhan and Koh (2004: 215) argue that an incorrect item translation may affect its DIF, hence it was important to explore these three items to understand the evidence of DIF in greater depth.

To develop theories of test translation error, Solano-Flores, Backhoff and Contrera-Nino (2009: 82) have summarised ten main languages dimensions of the item design, as illustrated by table 9.

The errors have been categorised according to three main sections, namely, item design, languages and content. Each category has a list of types of errors with its definition. When relating the teachers' responses of the translations in the

prePIRLS 2011 *'The Lonely Giraffe'* passage, the main conclusions of the current study can be linked to the test error dimensions as described in Table 9.

Item 1 responses seem to be an issue of dialect use in the classroom and the use of low frequency or unfamiliar words in the text. By observing the test errors, the error dimension for item 1 can be identified in language test translation as a register error since the original translated isiXhosa prePIRLS 2011 item contained unfamiliar, complex words to the learners.

Item 2 consisted of responses that indicated that low frequency words were being used in the item and the correct distractor was not included. According to test error theory, these comments can be interpreted as a type of origin and register error. Additionally, from the teachers' perspective the use of unfamiliar terms and words make the item a register error.

Similar to item 1, item 5 teachers' responses reflected dialects used in the classroom and the use of unfamiliar words in the item. According to Solano-Flores *et al.* (2009: 82), this error is recognised as register test error because the words are different from those to which the learners are exposed.

Using the theory of test error dimension to disseminate the meaning of the teachers' comments on *'The Lonely Giraffe'* passage translations adds to researched meaning of errors against evidence of DIF.

Conclusions

As the role and frequency of cross-cultural assessment programmes increase, strict translation guidelines as those used in the IEA studies are of great importance. Findings from this study presents limited evidence of DIF across a number of test items to a single passage that was administered in two languages. Despite limited measurement evidence, classroom practice evidence was further scrutinised since the vocabulary and orthography of dialect and standard isiXhosa often differ. In this study, three teachers from the different dialect areas often taught isiXhosa using their dialects. These practices may be considered as a code-switching strategy within the language (as opposed to switching between different languages). Furthermore, if teachers are going to apply dialect language principles in isiXhosa, this practice could potentially create confusion for the learners. Until now, the possible role of dialects has

largely been unexplored and while discussions on code switching and translanguaging exist, the dialectic differences within a language has been moot.

Academic performance goes hand-in-hand with language proficiency (Cummins, 2001: 61) and in a multilingual country such as South Africa, language proficiency not only requires fluency in English but also strong foundation skills in African Home Language. Early literacy foundation skills must enable easier acquisition of any additional languages (Cummins, 2001: 61), Pretorius 2014: 52), a premise of the current Language in Education Policy. African languages consistently perform lower than English and Afrikaans in literacy assessments such as the prePIRLS 2011, and yet again confirmed by PIRLS Literacy 2016 findings (Howie, Combrinck, Roux, Tshela, Mokoena and McLeod Palane, 2017: 13). Inevitably, if learners struggle with reading in the home language, their acquisition of English is also at risk, a language that is used as Language of Learning and Teaching (LoLT) from Grades 4 to 12, tertiary education and in most workplaces.

The policy intention of the Language in Education policy is to give recognition to 11 official languages in Foundation Phase in order for learners to learn from a strong mother-tongue base. This policy issue means that large-scale assessment in primary schooling has to take place across all 11 official languages. However, reliance on translations as valid method of assessing a multi-lingual population means that strict translation and quality assurance procedures have to be in place. With the availability of data from such studies, results can be used to re-evaluate the teaching of African languages, and in particular the training of teachers in the early grades and how language plays out in classrooms.

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