



Funda Wandé

Reading for Meaning

Developing a text difficulty indicator for isiXhosa early grades

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RESEP: Quantitative Education Research
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Lexile Readability Measure

1700L & higher
Advanced reader



2000L



700L

600L

500L

400L

300L

200L

100L

0L

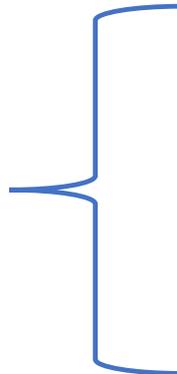
BR100L

BR200L

BR300L

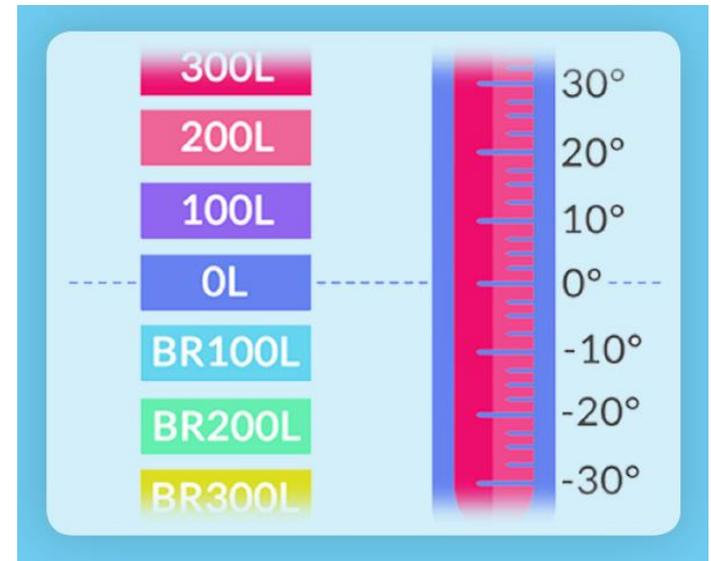


200L & lower
Beginner reader

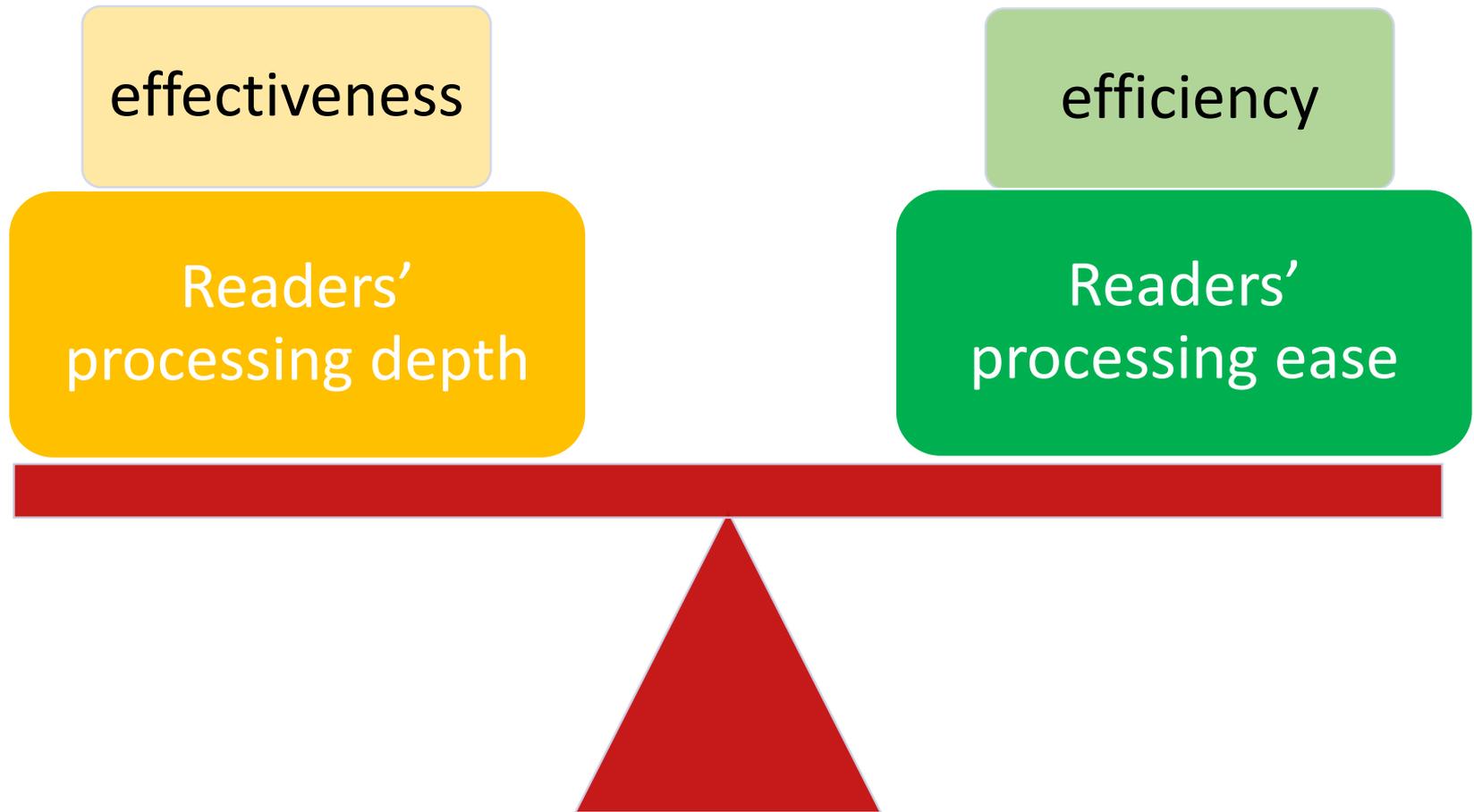


Beginner reader

- Need to understand what makes text difficult for children who are beginning to learn to read
 - Fitzgerald et. al. 2015

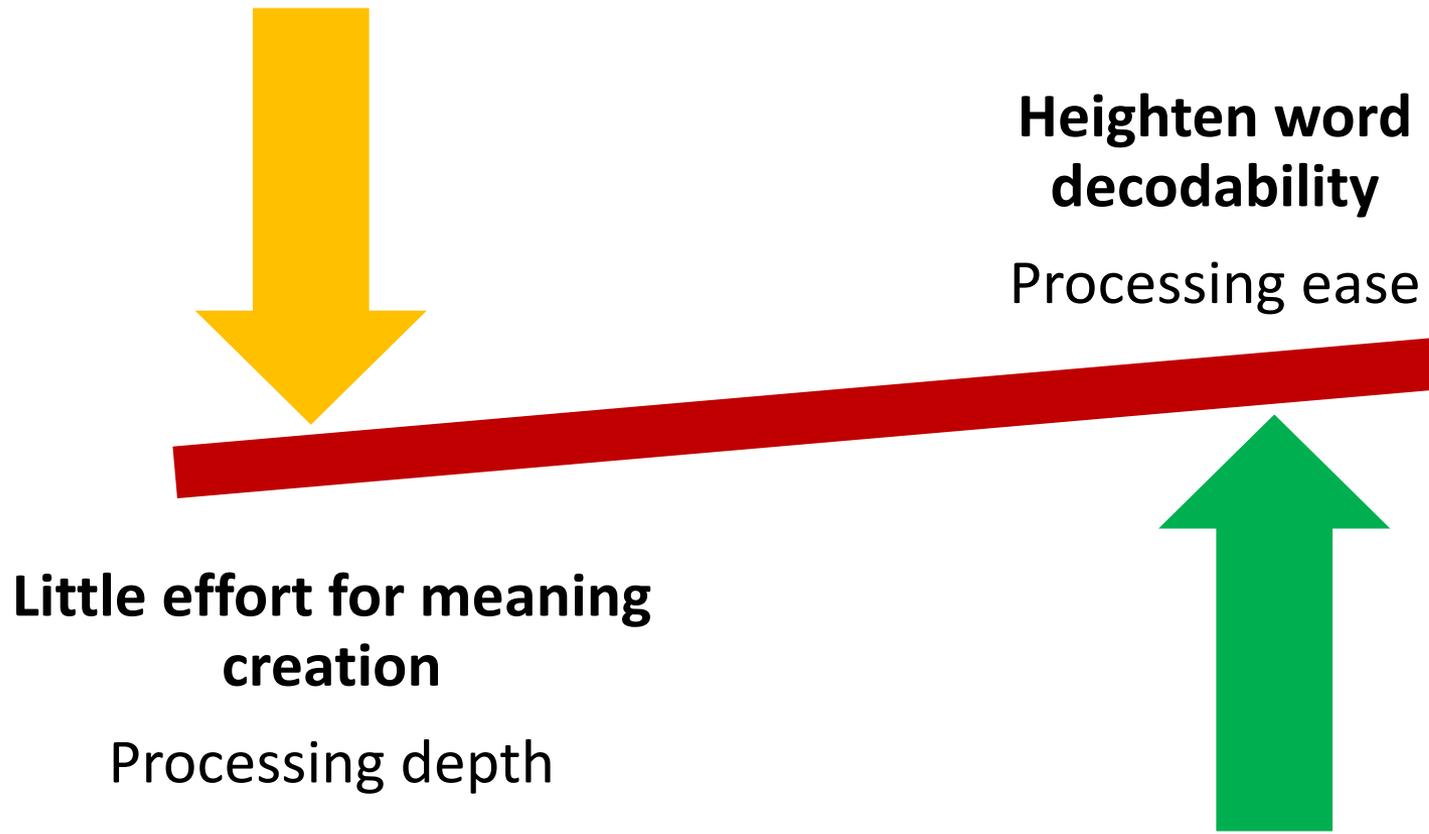


Optimal text



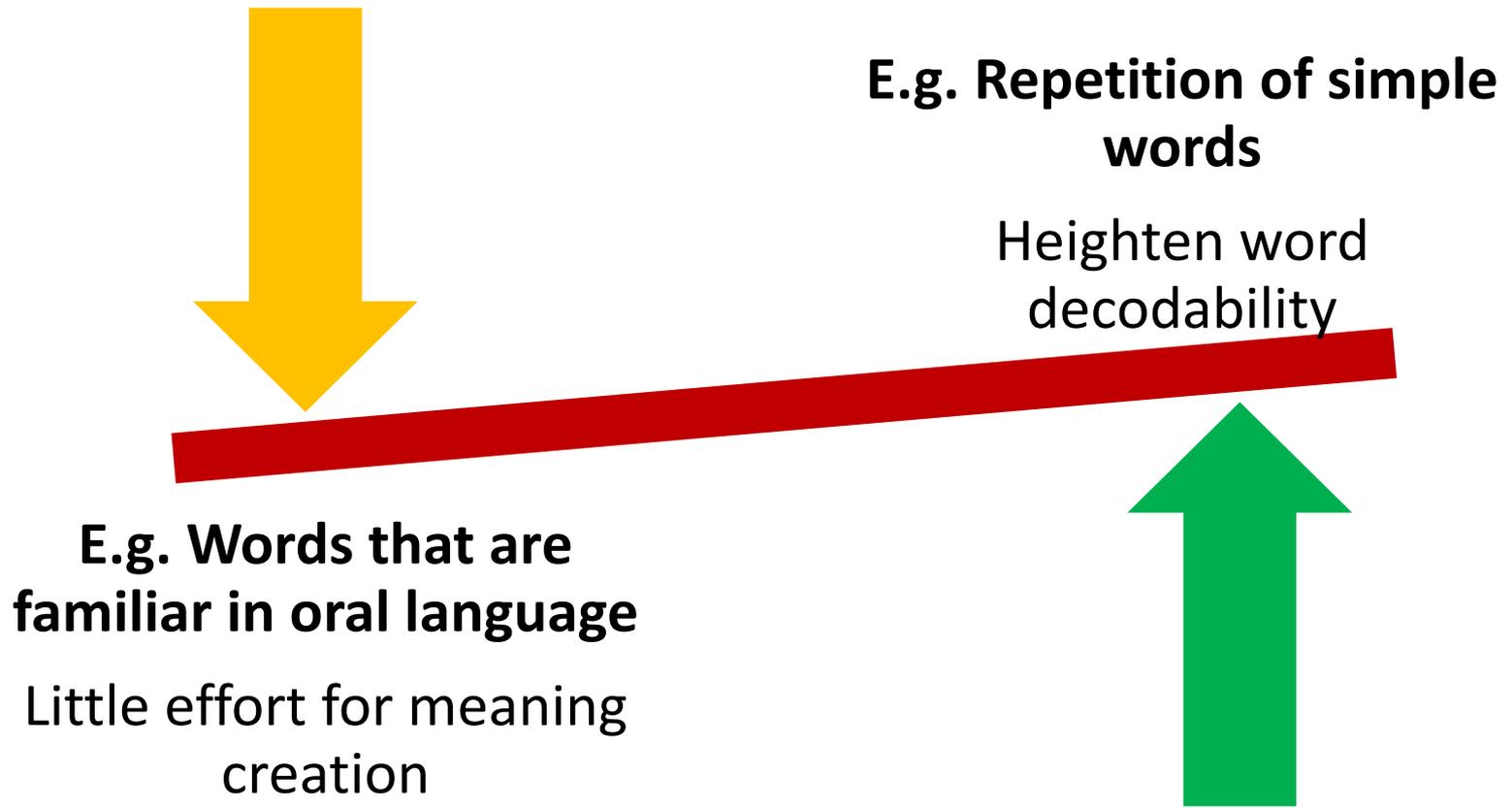
Barbaresi (2003)

Optimal text for beginner readers



Barbaresi (2003)

Optimal text for beginner readers



Hiebert & Fisher (2007)

isiXhosa Grade 1 text



Hayi, Velile! Suku...

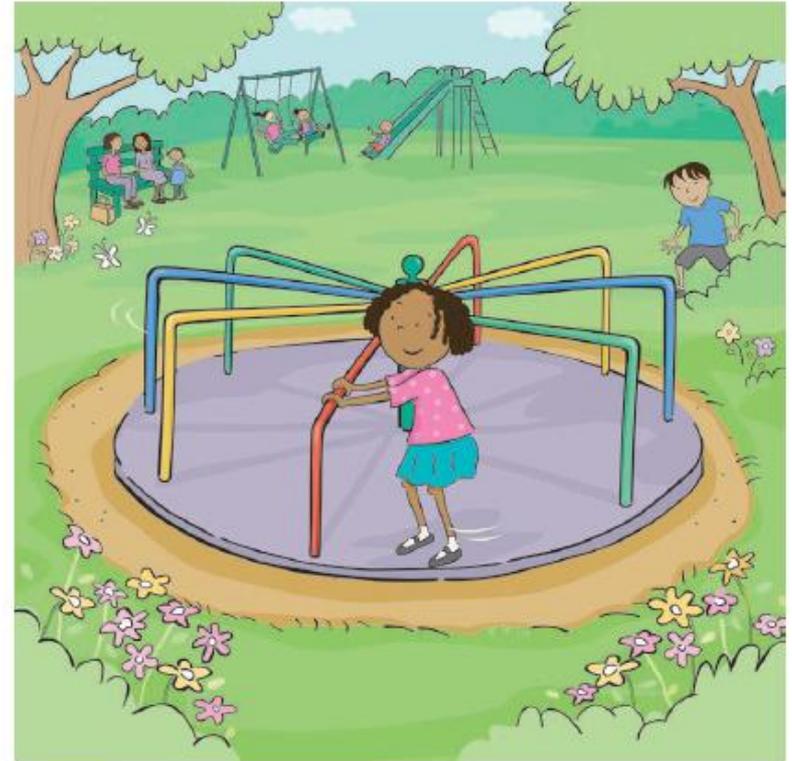


Hayi, wena!

isiXhosa Grade 2 text

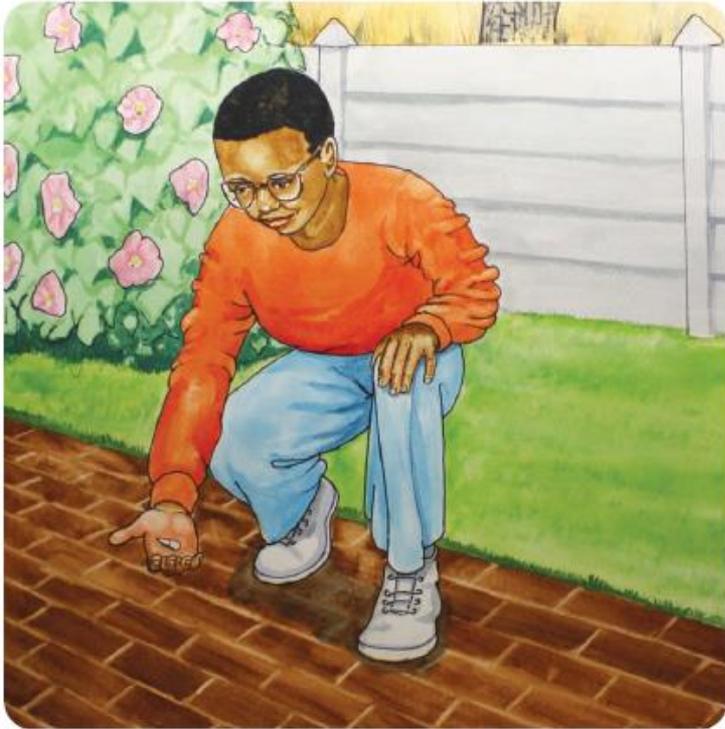


Ujikeleza egadini.
Uza kujikeleza egadini.

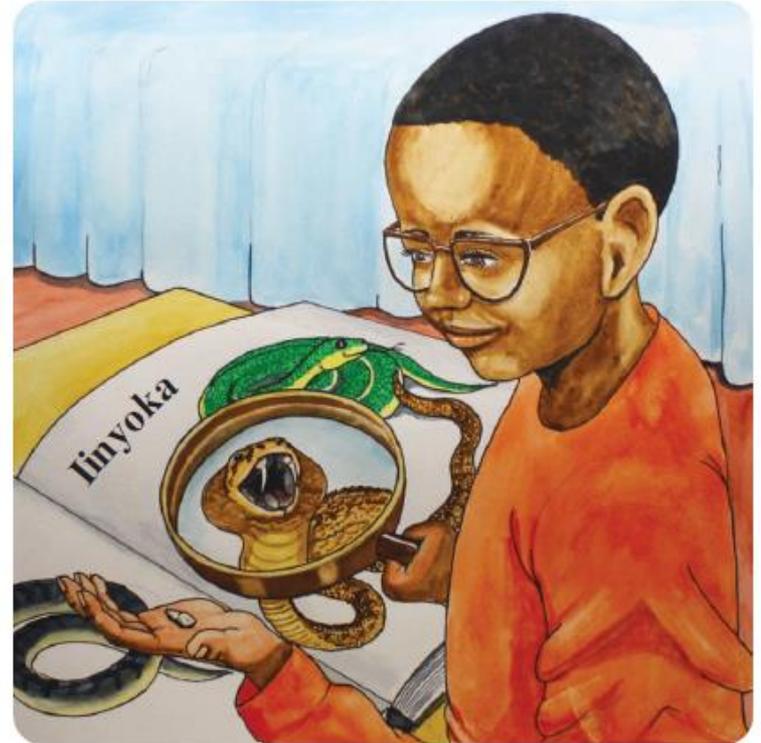


Ujikeleza uqalile ukujika-jika.
Uyajika-jika.
Nalo uza kujikeleza.

isiXhosa Grade 3 text



Ngenye imini uLwazi ubona izinyo.
'Ingaba lizinyo lesilwanyana?'
uyazibuza efunisela.
ULwazi uzixelela ukuba uza
kufumanisa ngeli zinyo.

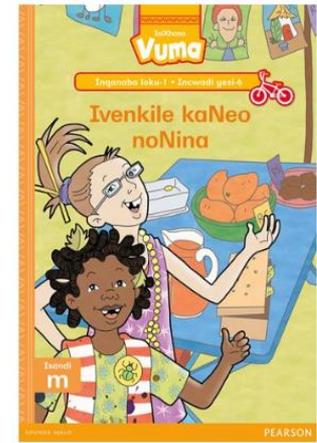
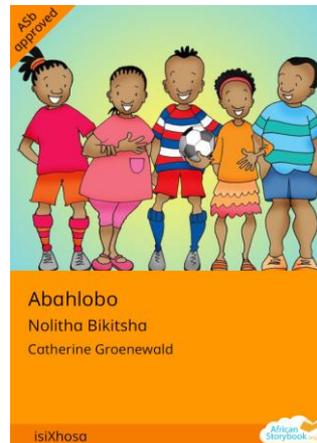


Ubona umfanekiso wenyoka
encwadini yolwazi lwezilwanyana.
Upopola amazinyo enyoka ...
Asililo izinyo lenyoka. Amazinyo
enyoka awafani neli zinyo.

Early Grade Corpus

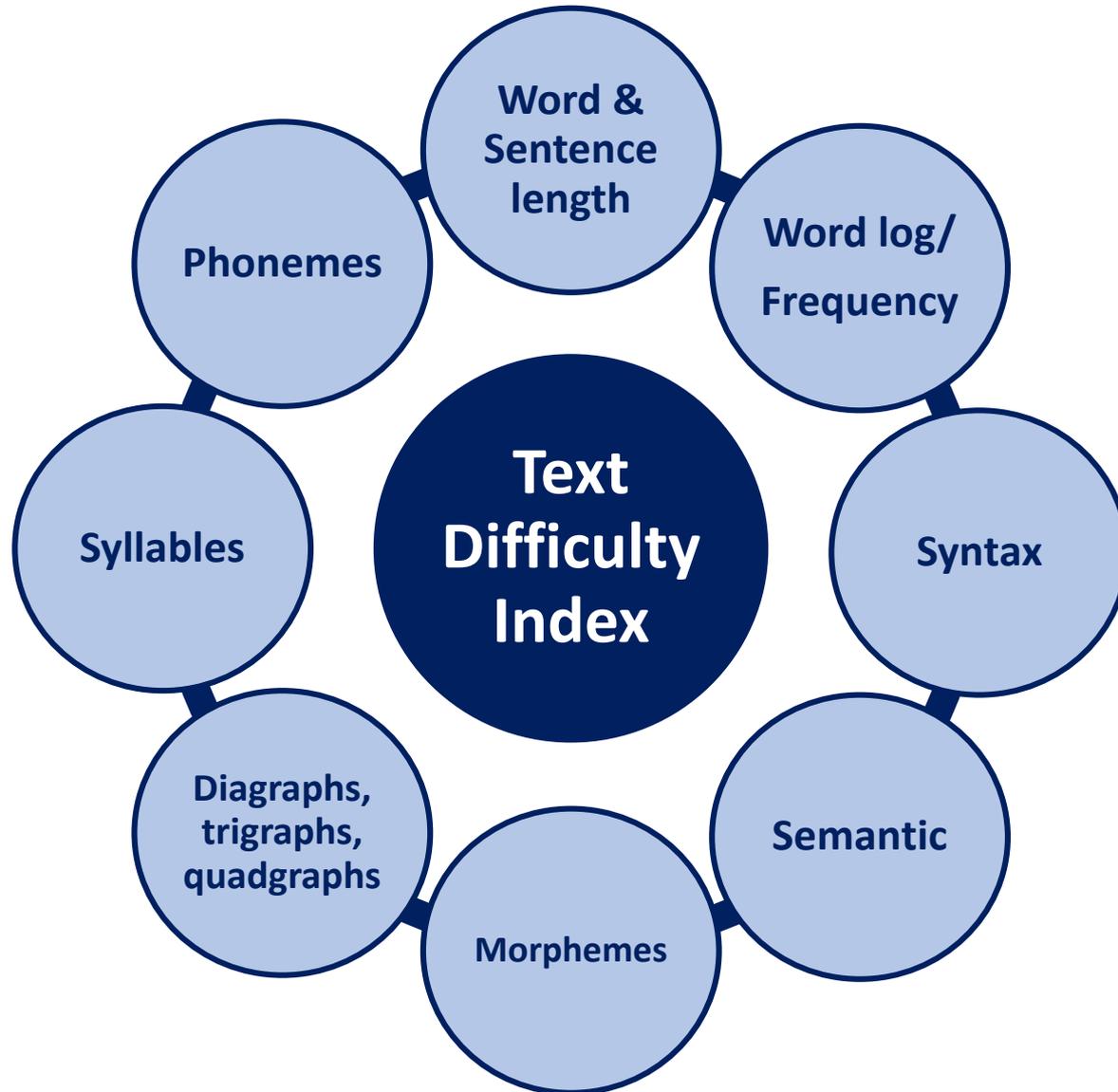
- isiXhosa Grades R – 3 reading texts
- Includes stories from:

- African Storybook
- Cambridge
- DBE
- Kagiso
- Macmillan
- Oxford
- New Heights
- Sunshine
- Vuma
- Vula Bula



- Total of **700** stories in the Corpus
- Use the program **R** to do the text analysis

Methodological Approach



isiXhosa writing system (orthography)

Transparent:

1-to-1 mapping between meaning and sound

- o will always sound like /o/
- Contrast to English o in “so” and “to”

Tonal language:

pitch conveys meaning

- bona (see) and bona (them)

Transparent orthographies: access words via phonological route

isiXhosa writing system (orthography)



isiXhosa text characteristics

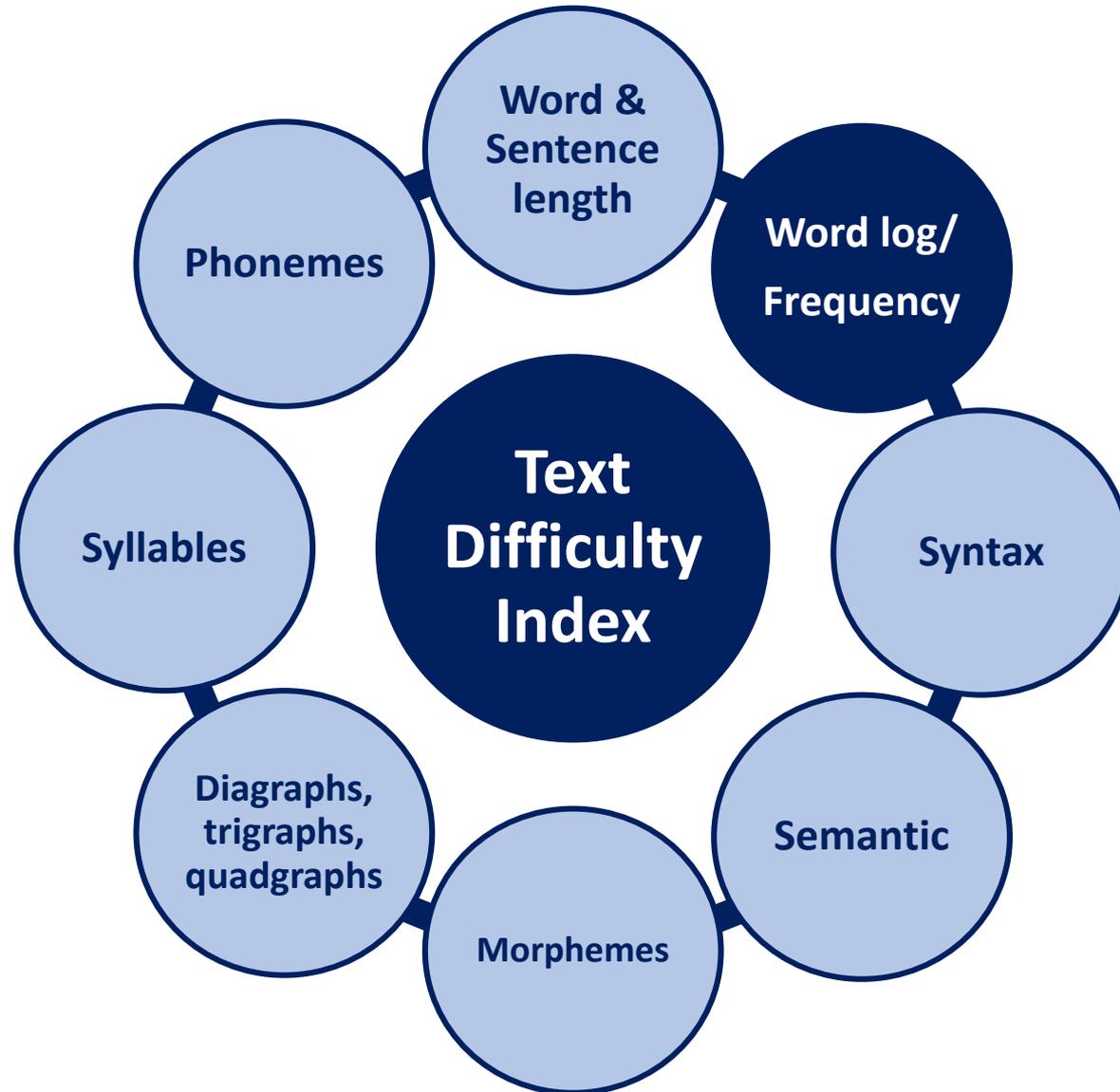
Agglutinating

- Sequence of morphemes attached to a stem

Inflectional

- Conveys meaning by adding prefixes, suffixes, and infixes

Methodological Approach



Letter Frequency analysis

Letter	Frequency (%)
n	15.9
k	11.1
l	10.6
h	8.2
m	6.2
b	5.8
s	5.8
w	5.7
y	5.6
z	4.9
t	4.6
g	4.3
d	3.5
p	1.8
c	1.2
f	1.1
q	1.1
v	0.8
x	0.7
j	0.6
r	0.5

n, k and l are the highest frequency letters > 10%

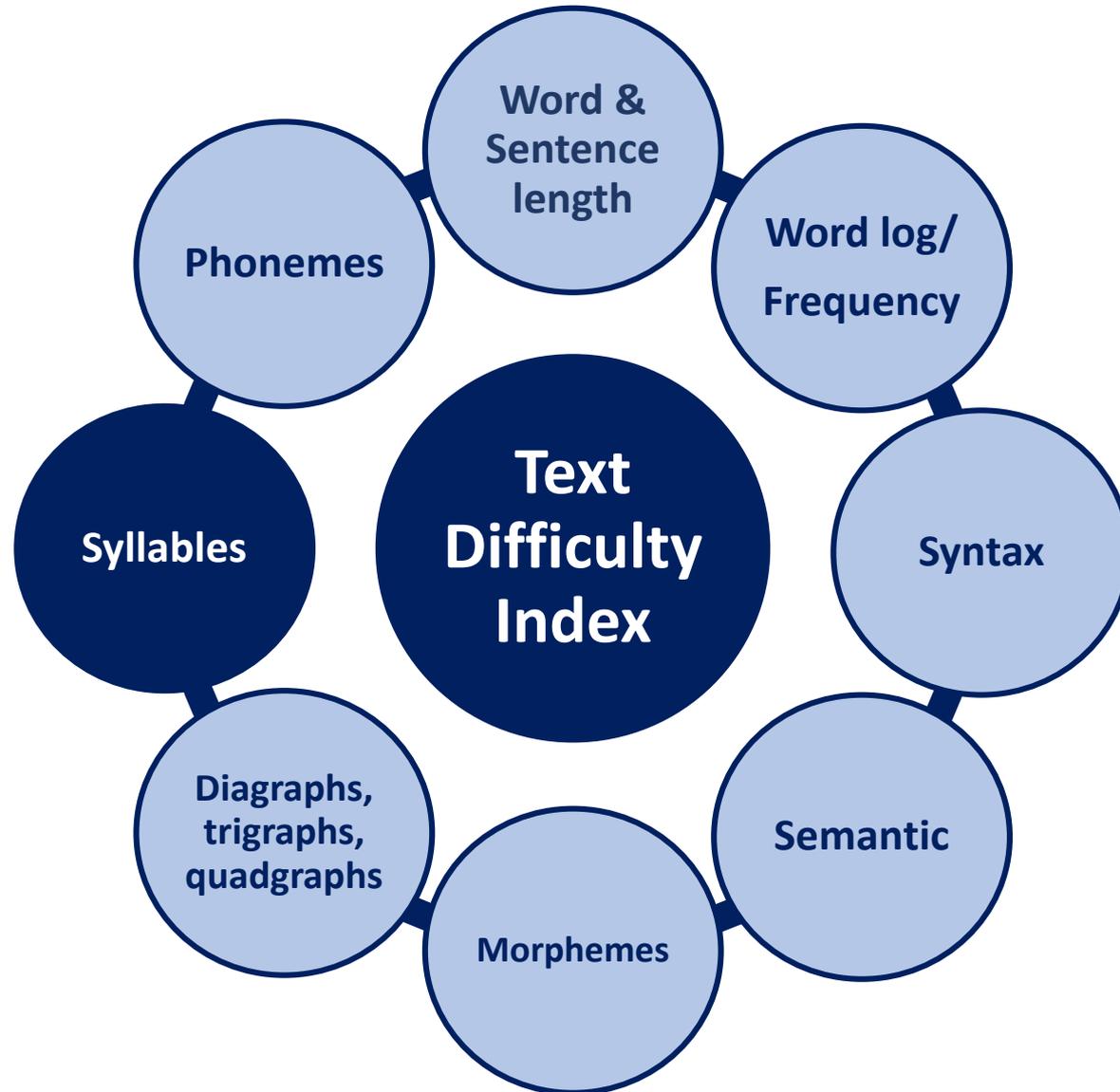
v, x, j and r are the lowest frequency letters < 1%

In calculating in the index, should lower versus higher letter frequency be included?

Word Frequency analysis

Word	Frequency (%)	Word	Frequency (%)
ukuba	1.1	a	0.2
watsho	0.8	abantu	0.2
kakhulu	0.7	apha	0.2
ke	0.6	apho	0.2
kodwa	0.6	b	0.2
kwaye	0.4	c	0.2
le	0.4	eli	0.2
umama	0.4	hayi	0.2
yakhe	0.4	incwadi	0.2
emva	0.3	ingaba	0.2
kunye	0.3	into	0.2
lo	0.3	iphepha	0.2
ngoku	0.3		
nje	0.3		
ukuze	0.3		
umnumzana	0.3		
wakhe	0.3		
xa	0.3		

Methodological Approach



Length of words

Multisyllabic words



Hayi, wena!

Syllables

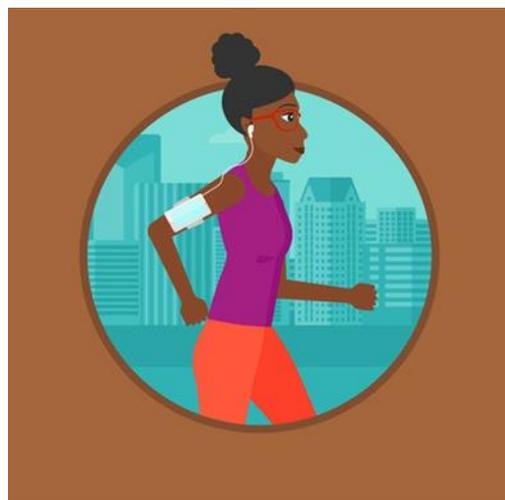
u|ya|ba|le|ka

she

is

running

Agglutinating:
Sequence of
morphemes
attached to a stem

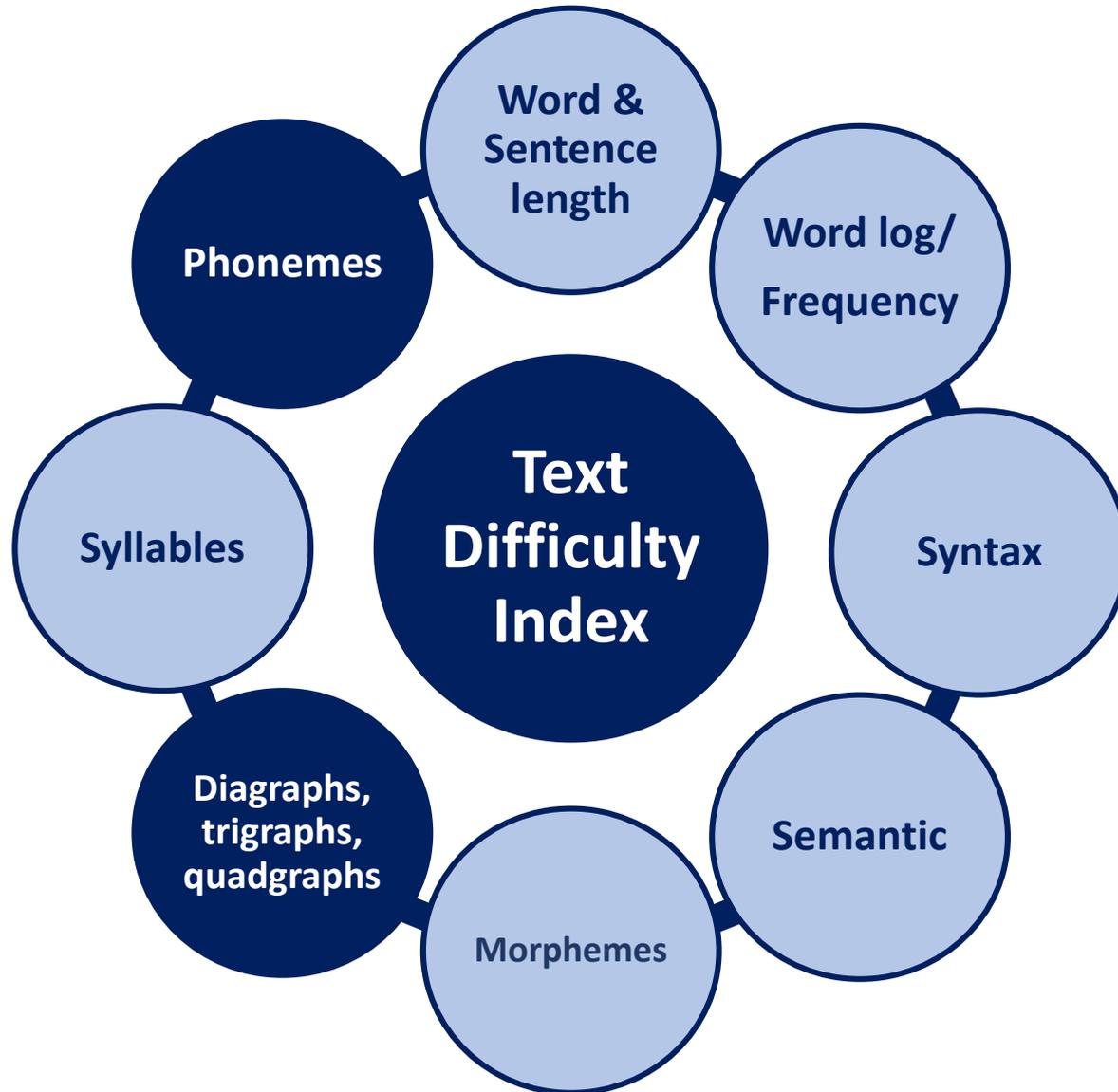


Morpheme:
Smallest unit that
conveys meaning

Syllables Frequency analysis

Syllable	Frequency (%)	Syllable	Frequency (%)
u	4.7	nda	0.5
ku	4	nye	0.5
i	3.4	phe	0.5
e	3.3	we	0.5
la	3.1	hla	0.4
ba	2.6	kha	0.4
le	2.5	kho	0.4
ka	2.4	ki	0.4
na	2.4	lwa	0.4
ma	2.2	nto	0.4
wa	2.2	nya	0.4
zi	2.1	nzi	0.4
a	2	so	0.4
		the	0.4

Methodological Approach



Phonemes Frequency analysis

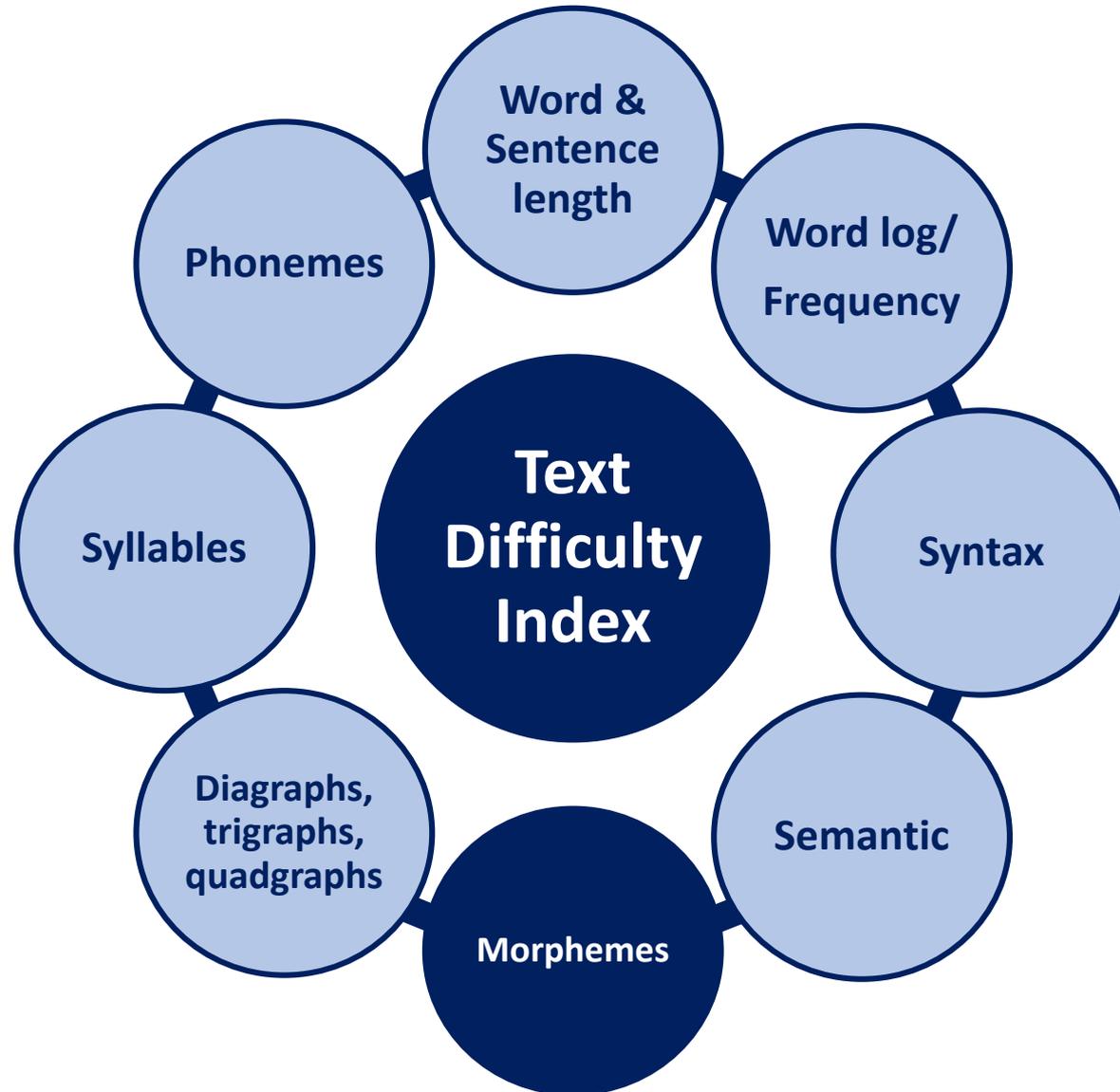
Phoneme	Frequency (%)
l	11.4
k	10
n	7.3
b	6.2
y	5.7
s	5.6
z	5.5
ng	4.2
m	4
w	4
nd	2.3
th	2.3
kh	2.2
ph	1.9
kw	1.5
f	1.2
ny	1.2
d	1.1
mb	1.1

c	0.5
h	0.5
nc	0.5
ndl	0.5
nj	0.5
sh	0.5
x	0.5
mn	0.4
ty	0.4
dl	0.3
dw	0.3
j	0.3
mv	0.3
mz	0.3
nts	0.3
p	0.3
gq	0.2
khw	0.2
mf	0.2
mhl	0.2



According to CAPS *mf* introduced in HL isiXhosa Gr 1 term 1

Methodological Approach

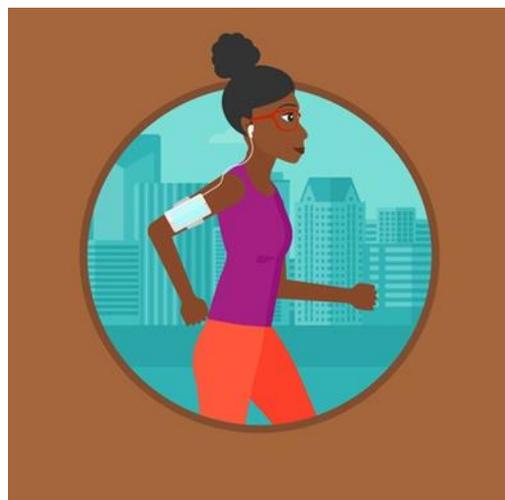


isiXhosa is an agglutinating language

uyabaleka

she is running

Agglutinating:
Sequence of
morphemes
attached to a stem



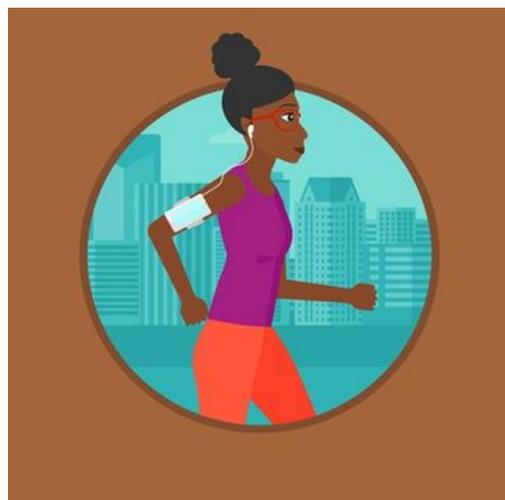
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Morpheme:
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isiXhosa is an agglutinating language

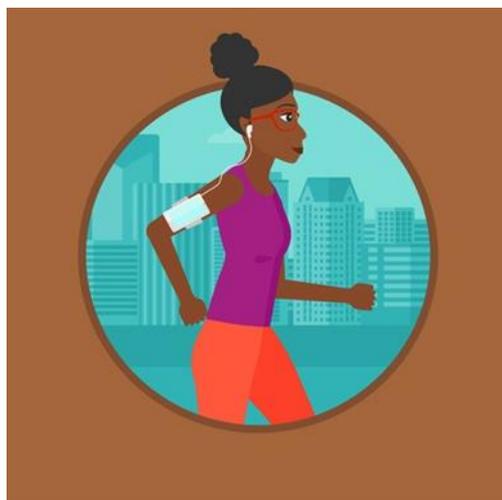
ebebalekile

she

had

run

Agglutinating:
Sequence of
morphemes
attached to a stem



Morpheme:
Smallest unit that
conveys meaning

Lemmas Frequency analysis

Lemma	Frequency (%)
ni	7.9
khulu	4.2
nzi	2.8
nye	2.5
ba	2.4
thand	1.9
ntu	1.8
manzi	1.7
tata	1.7
fun	1.5

Lemma	Frequency (%)
fu	0.1
fumanek	0.1
funda	0.1
futshan	0.1
goduk	0.1
gqum	0.1

Still need to figure out how to factor in morphemes

i.e

Baleka - run

Uyabaleka – you are running

Ubalek**ile** – he/she has run away

Usa**baleka** – are you still running?

Siyabaleka – we are running



Visual patterns

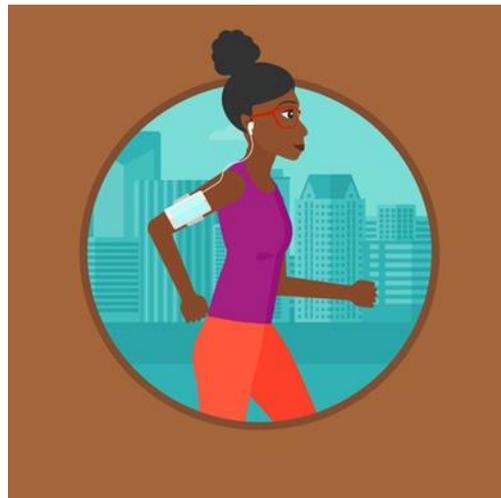
u|ya|balek|a

she

is

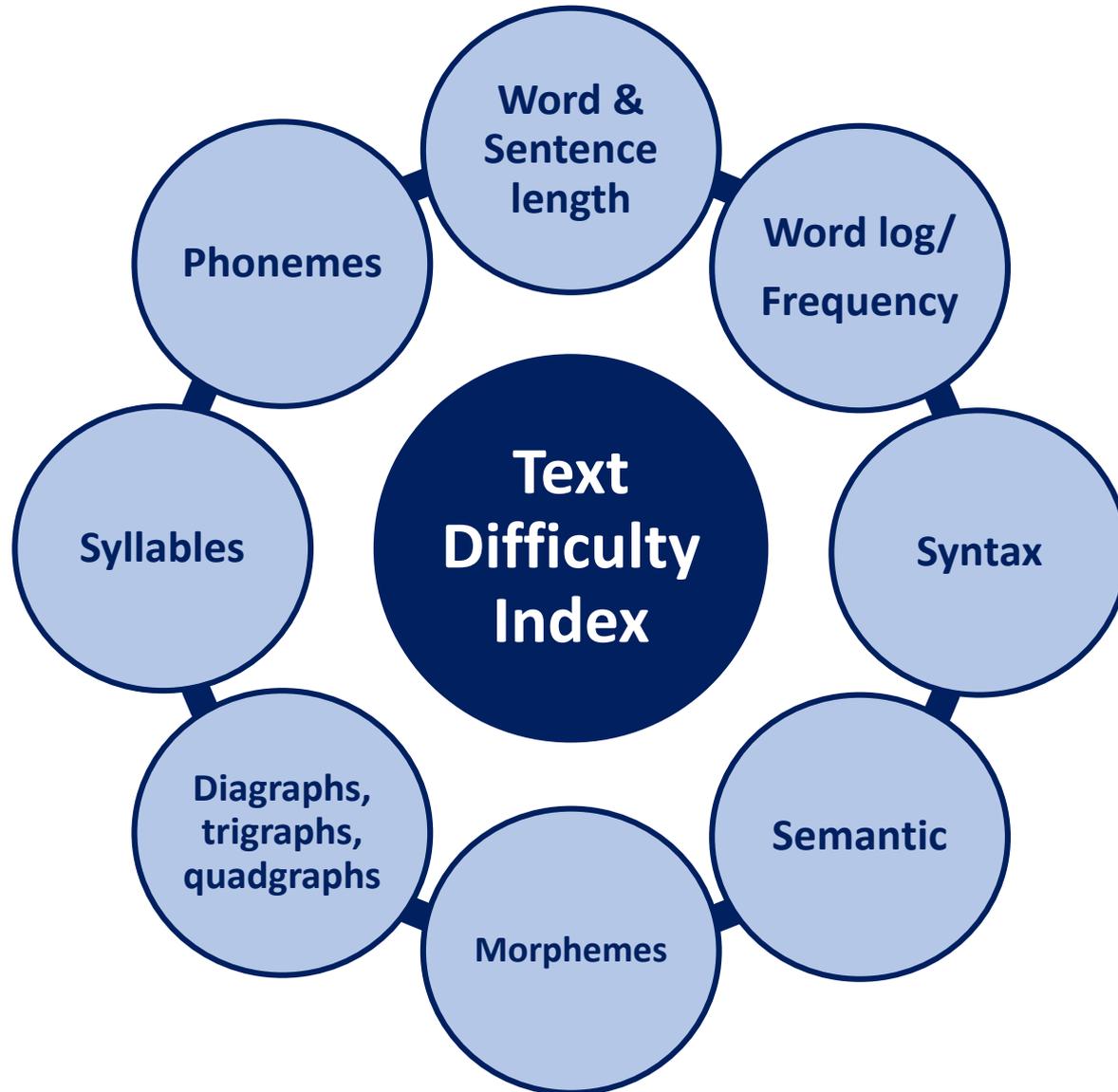
running

Agglutinating:
Sequence of
morphemes
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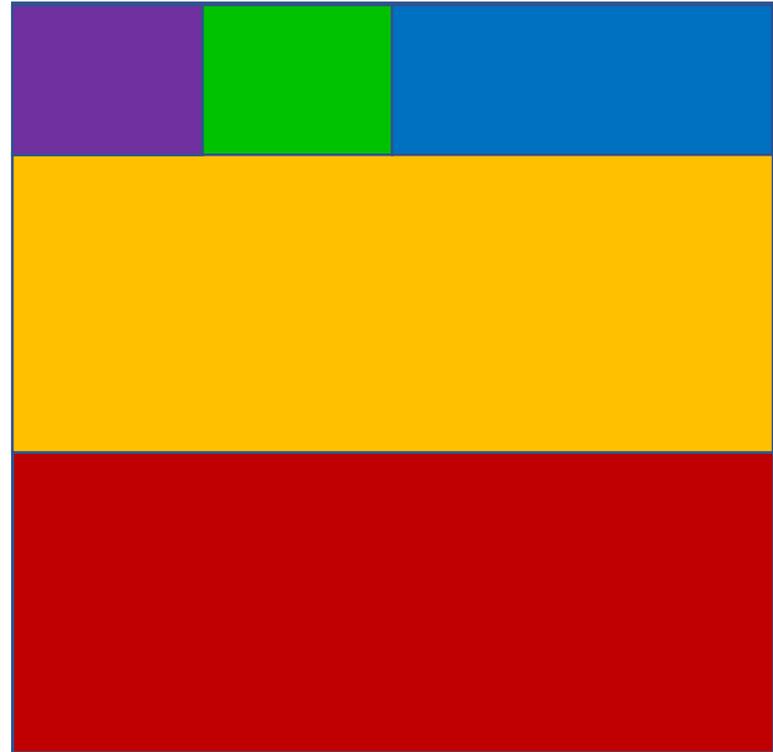
Morpheme:
Smallest unit that
conveys meaning

Methodological Approach



Text difficulty index

$$\begin{aligned} &= 0.05 * (\text{no. of letters}) \\ &+ 0.05 * (\text{no. of words}) \\ &+ 0.1 * (\text{no. of sentences}) \\ &+ 0.4 * (\text{ave. syllables/word}) \\ &+ 0.4 * (\text{words/sentence}) \end{aligned}$$

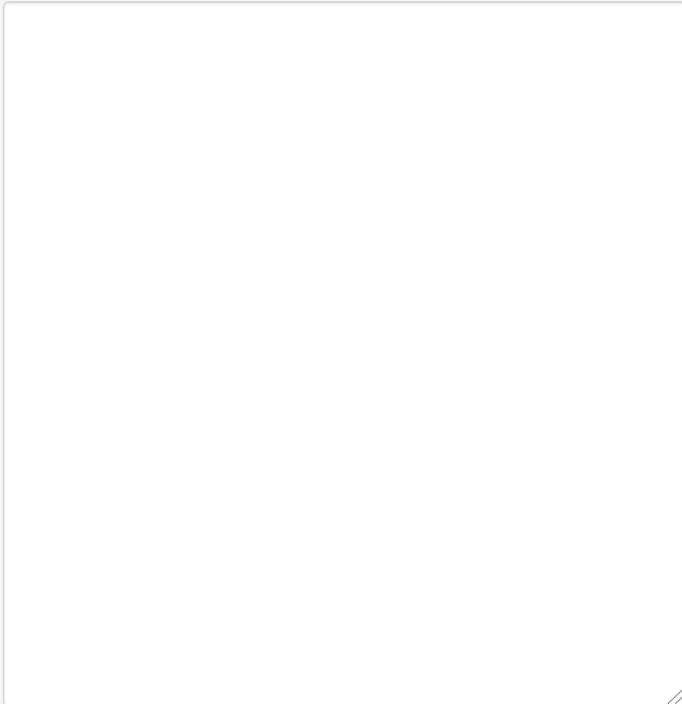


Text Difficulty Index

isiXhosa Text Difficulty

Enter isiXhosa passage to assess

Paste your text here



Overall Difficulty Score:

Detailed Results

Number of letters:

Number of syllables:

Number of words:

Number of sentences:

Average number of syllables per word:

Average number of words per sentence:

Syllable complexity:

Text Difficulty Index

Enter isiXhosa passage to assess

Paste your text here

UHamisi ubona
inkwenkwe enxibe
ihempe entle.
Yaze vantle ke la
hempe, wacinga
njalo uHamisi

Overall Difficulty Score:

9.5

Detailed Results

Number of letters:

76

Number of syllables:

35

Number of words:

9

Number of sentences:

1

Average number of syllables per word:

3.89

Average number of words per sentence:

9

Syllable complexity:

	Frequency	Percentage
Simple	19	68
Digraph	5	18
Trigraph	4	14

Text Difficulty Index

Enter isiXhosa passage to assess

Paste your text here

unamengele
yona.
Hamisi, kufuneka
ndikuthengele
iyunifomu, watsho
utata wakhe.
Andinayo imali
evanele
vokuthenga loo
hempe, watsho
utata.
Utata kaHamisi
uhlawulela
iyunifomu.
Uyothuka xa ebona
kubuya itshintshi.
Kusele imali
evanele ukuba
athenge nehempel.
Le yimini kaHamisi
yethamsanqa!
Inokuba uza
kukhetha eviphi
ihempe?

Overall Difficulty Score:

30.2

Detailed Results

Number of letters:

471

Number of syllables:

221

Number of words:

34

Number of sentences:

12

Average number of syllables per word:

6.5

Average number of words per sentence:

2.833333

Syllable complexity:

	Frequency	Percentage
Simple	135	73
Digraph	39	21
Trigraph	11	6
Quadgraph	1	1



THANK YOU!



Funda Wande
Reading for Meaning

Lexile Readability Measure

Text Lexile: A measure of **text difficulty** level (overall text complexity)

Reader Lexile: A measure of **readability**

