Linguistic complexities of mathematics test items

Research on the Grade 4 2013 ANAs

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Hurdles in learning mathematics in English

Learning mathematics in English is problematic for English Second Language learners because

- ❖ first they have to learn English
- ❖ and then learn mathematical computations and operations
- ❖ they should also learn challenging technical mathematical vocabulary
- ❖ and then grammatical structure of mathematical language.

Research shows that it is not only English learners who struggle with mathematical English but also English home language (HL) speakers.

If English HL speakers are also challenged by reading despite their intuitive knowledge of language, the challenge can only be worse for those learning in EAL.

Therefore, mediation of language is essential.

Grade 4 transitional stages

Grade 4 is a critical stage at which learners are experiencing 4 transitions.

❖ from using isiXhosa (Eastern Cape) in Grade 3 to using English as a LoLT in Grade 4.

❖ from reading mostly narrative, story-like texts to reading expository texts with more content-dense vocabulary in Grade 4

❖ from 'learning to read' to 'reading to learn.' In the FP, learners are trying to develop the skill and art of reading but when they come to Grade 4 they are expected to read different content subjects and learn from what they read.

❖ from more concrete thinking in the FP to more abstract thinking in the Intermediate Phase

BUT ANAs don't seem to accommodate this

- Grade 3 – no longer read to learners
- Language of questions is often difficult, ambiguous even for L1 learners
- Phase 1 research analyzed language of 2013 Gr 4 ANA questions

Language features causing linguistic complexity in test items

❖ Total number of words in the item

❖ Number of different words with 7 letters or more

❖ Number of sentences

❖ Number of prepositional phrases

❖ Number of ambiguous/multiple meanings words e.g. *difference, left, factor, multiple and hands*

❖ Number of homophones e.g. *write/right, buy/by, of/off , board/bored*.

Linguistic features (cont)

❖ Number of passive sentences e.g *The number 6 555 rounded off to the nearest 100 is….'*

Learners understand it easily when asked as :*Round off 6 555 to the nearest 100'*

❖ Number of specific mathematics vocabulary e.g. Hexagon, ratio, quadrilateral, symmetry etc

The more the linguistic features an item has, the more complex it is.

Gr 4 2013 ANAs

- Most questions complexity)LCI) greater than 10

- Need for strategies to help learners understand the questions

Interviews – many learners could solve problems when they understood what the question was asking

- Used code switching, reading aloud, focusing on unfamiliar words, question rephrasing

Thank you!