What are the challenges for girls being taught math in English when they learned it in Xhosa before?

The South African multicultural society is characterized by a rich diversity, which entails eleven different official languages of the country. Although English is defined as the language for business and government and as one of the two main languages used at schools, less than ten percent of the population speak it as their first language. Consequently for most of the children in school English is not their home spoken language.[1] This linguistic diversity often causes multilingual classrooms where the learners' mother tongue looms large especially during primary schooling. "Most learners come to school with their home language the only instrument in which they can express themselves. The learners' sociocultural background incorporating indigenous knowledge […] is also tied to their home language."[2] During the first three years of schooling African languages are often used as the languages of learning and teaching, afterwards English and Afrikaans are compulsory for this purpose.[3] Thus switching the teaching language during school education causes many challenges, particularly for mathematics education.[4]

The Human Science Research Council of South Africa (HSRC) ascertained that a lot of "recent studies have shown that most learners who speak African languages start failing mathematics when they reach the upper grades."[5] The stark shift of the education language to English after three years using a home language like IsiXhosa entails that the students often have insufficient English skills. This inadequate academic proficiency often impacts in problems in learning. The Threshold Project in 1990 "found that in three years of learning English as a second language, children had not acquired a sufficient range of vocabulary to be able to use it efficiently".[6] Research detected language as one of the needed key dimension for understanding mathematical key concepts. Because of having trouble with understanding and using English, the pupils often have problems in understanding the key concepts in mathematics.[7] Numerous studies verify that there exist significant language and communication problems with these children learning mathematics in a second language. The resulting challenges for the learners are:

- Lack of understanding mathematics questions
- Inability to communicate answers in instances where they did understand the questions
- Bad performance particularly in questions requiring a written answer[8]

The HSRC enumerates additional challenges for the learners:

- Struggle in understanding words, fractions or sums in which geometry has to be used to calculate area

[1] Howie 2003:1f.
[2] Bloch et al. 2011:40
[3] Lafon 2009:8
[4] Howie 2003:1
[5] Bloch et al. 2011:40
[6] Lafon 2009:12
[7] Schäfer 2009:512
[8] Howie 2003:3

- Substantial problems in communicating answers in tests
- Struggle in reading mathematics textbooks written in English, as the content and themes are unfamiliar to them, the vocabulary strange and new words are introduced at a very rapid pace[9]

Due to this challenges it is not surprising that a "2004 study revealed that the vast majority of Grade 6 learners in the Western Cape have not even mastered the literacy and numeracy levels expected of Grade 4 learners."[10]

It can be stated that since mathematics is taught in English, the students with another first language have to face a dual task: learning maths and at the same time learning the language this subject is taught in. In order to deal with the mentioned arising challenges within mathematics education there is the inevitably need of code-switching, which means translating and speaking in two languages during the lesson. As an outcome code-switching within mathematical education has a three dimensional dynamic for the children, which is hard to cope with. Mathematical education in English requires concurrently access to the language of learning (English), access to mathematical discourses and access to classroom discourses (home language).[11] A specific view to the Xhosa-dominant schools in the Western Cape shows, that the challenges of code-switching (English-IsiXhosa) are a common occurrence there, as the majority of the books and teaching materials, especially in mathematics, are written in English.[12]

Language barriers in school cause challenges, which lead to disadvantages and negative performance, especially in maths. But one can still go one step further and find more negative aspects of the language diversity within South Africa's education system. With not being able to accomplish the school's requirements because of language problems, students' "self confidence and sense of self in society are undermined […] and these are further undermined by the experience of repeated underachievement."[13]

[9] Block et al. 2011:40f.
[10] Bloch et al. 2011:40
[11] Adler & Setati 2000:246ff.
[12] Bloch et al. 2011:40
[13] Owen-Smith 2010:31

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