READING SKILLS AND MATHEMATICS

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The Departments of Mathematics and Linguistics at Unisa have been investigating the relationship between reading difficulties and mathematics learning, with a group of foundation level students. Some issues involved are the following.

- Potential problems when the primary language is oral rather than written.
- Relationship between early language acquisition and future mathematical ability. (Ellerton and Clements, 1988; Souviney, 1981, in Garaway, 1994)
- Relationship between bilingualism and the ability to learn mathematics. (Bain & Yu, 1980; Ben-Zeev, 1977; Clarkson, 1991; Cummins and Gulutsan, 1974; Dawe, 1983; Duran, 1988; Hakuta & Diaz ,1984; Prins, 1997; Secada, 1988; Zepp, 1989)
- Specialised academic and mathematical vocabulary and skills; technical terms.
- Specialised semantic and syntactic structure of mathematical discourse.
- Special symbols which denote processes and concepts.
- A variety of ways in which the same operation can be indicated.
- The use of passive voice.
- Visualisation of problems or concepts.
- Lack of equivalent words in the mother tongue.
- The redundancy of words in ordinary language
- Reading rate adjustment; eye movement patterns.

The Unisa team postulated that a strategy for effective reading and learning of mathematics, initially using a volunteer group of foundation level students, and applying the SLAMS (Second Language Approach to Mathematics Skills) (Dale & Cuevas, 1987) method, should take into account

- *level of difficulty of text*, in particular: general vocabulary and language proficiency; academic vocabulary and mathematical vocabulary; identification of ordinary, mathematical or multiple meanings of words
- *syntactic structures* specific to mathematics
- *semantic/logical relations* specific to mathematics
- *reading rates*
- *trialing the PQ4R technique*: (P)preview, (Q)question, (R) read detail, (R)reflect, (R)rewrite, (R)review
- *verbalisation of mathematical notation*
- *anaphoric references within the text*.

We plan to generalise the results into a strategy we can use with an entire cohort of similar students in 2002. We hope to determine whether the reading enhancement programme has any significant impact on the extent to which these students can meaningfully read, and hence learn, mathematics.

The above information will be more comprehensively available at the conference, as well as details of the references on which this paper is based.