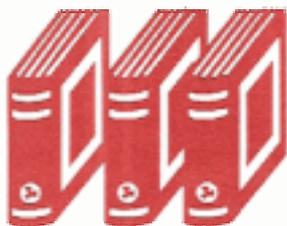

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KASSEL Project An NIE - Exeter Joint Study

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The main aim of this international project is to carry out research into the teaching and learning of mathematics in several countries, and ultimately to make recommendations about good practise in helping pupils achieve their mathematical potential. This research is based on a longitudinal study of samples of pupils in participating countries. The project began in September 1993 in England, Scotland and Germany. Singapore together with Australia, the Czech Republic, Finland, Greece, Holland, Hong Kong, Hungary, Japan, Norway, Poland and Florida State (USA) joined the project in 1995. Dr Berinderjeet Kaur and Dr Yap Sook Fwe from the Division of Mathematics, National Institute of Education are the coordinators of the project for Singapore.

The entire cohort of Secondary Two (Special Express and Normal (Academic) pupils in 1995 from seven schools spread across the island participated in the project. 26 (9 male, 17 female) mathematics teachers and 64 Secondary Two classes from the seven schools were involved in the project. Approximately 2400 pupils took 4 short mathematics tests (Potential, Number, Algebra and Shape & Space) in January 1995 and 3 short mathematics tests (Number, Algebra, Shape & Space) in October 1995. The tests used in January and October were parallel forms i.e. questions in both the tests were exactly matched.

The data collected in January 1995 using the 4 tests have been analysed and presented in the form of a report "KASSEL Project Report - First Phase (Jan - Oct 95)" which is available at the National Institute of Education's library or from the coordinators. The key findings documented in the report are:

- the distributions of the Potential Test scores are fairly normal for the entire sample and for the three streams,
- generally, the performance of the pupils for the three topic tests are closely related to the actual curriculum coverage of the Secondary One syllabus at the time of the test-

ing, the mean scores are highest for Number Test and lowest for Shape & Space Test across the three streams,

- generally, items with a very low percentage of correct responses are those that involves content which has not been taught to the pupils but there are however a few exceptions.
- there is a positive association between pupil performance on the Potential Test and that on the Topic Tests.

Data were also gathered using school, class, teacher and pupil questionnaires. The analysis of the data collected in October 1995 using the tests provided information regarding the progress made by the pupils in their first year of participation in the project. Based on the progress made by the pupils in 1995, a sub-sample was drawn from the 2400 pupils for a more in-depth study in 1996. During the first half of 1996, 137 pupils were interviewed. Among these pupils were those who made positive, zero or negative progress. Mathematics lessons taught by 21 of the 26 mathematics teachers who taught the pupils during the first year of participation in the project were observed. The teachers were also interviewed.

Preliminary analysis of the data collected using the teacher and class questionnaires in 1995 and lesson observations during the first half of 1996 suggests that some teacher and class characteristics were prevalent in the seven participating schools. It is noteworthy that in the seven schools where Year 8 mathematics teachers and classes were observed, it was found that there were more female than male teachers, half the teachers had 5 years or less of mathematics teaching experience and less than two-fifths of the teachers taught only mathematics at school. More than three-fifths of the teachers were university graduates.

In general, the teachers were found to be task oriented and their lessons were highly structured

with specific objectives. A majority of the lessons were expository in nature, punctuated by appropriate class practice emphasising procedures, answers and accuracy. The teachers have sound knowledge of mathematics and are able to handle their teaching confidently. They are in control of their lessons, and they may best be described as firm yet approachable by their pupils.

The average class size was 37 and pupils were either seated in rows facing forward or in pairs facing forward. In class, pupils were orderly, quiet and receptive to teaching. They seldom raised doubts but were responsive when called upon. Pupils had 5 or 6 periods of mathematics per week. At least once a week, pupils were given homework which was marked. Whole class teaching appeared to be the main style of teaching. The textbook, white board and overhead projector were observed to be essential aids. Pupils were formally tested at least

twice a year and class tests were held at least once a term (ten weeks) for mathematics. The use of calculators was not found to be prevalent in the classes.

At present, more data are being collected with the help of the class and teacher questionnaires as the pupils are now in Secondary Three and most of them are being taught by a 'different mathematics teacher'. The pupils were also streamed at the beginning of 1996 into Science/Arts/Commerce streams, and as such they were no longer in the same classes. In October 1996 the 2400 secondary pupils will again take four short mathematics tests (Number, Algebra, Shape & Space and Applying Maths).

(Note: KASSEL is the name of a town and also a university in Germany. The project was initiated by Dr Gabriele Kaiser and Prof Weiner Blum at the Kassel University in Germany and Prof David Burghes at Exeter University in UK.)