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## **Report on organizing the ROSE survey in Malaysia**

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### **1. ROSE team**

The Malaysian ROSE team consists of Professor Dr. Aminah Ayob and Associate Professor Dr. Yoong Suan, both of whom are faculty members of the School of Educational Studies, Universiti Sains Malaysia at Penang, Malaysia. Prof. Aminah Ayob is also the Dean of the School of Educational Studies. The Malaysian ROSE study was funded by a short-term research grant from the Universiti Sains Malaysia.

### **2. School system and science teaching**

The centralized Malaysian school system has 6 years of primary, 3 years of lower secondary, 2 years of upper secondary, and one to two years of pre-university or matriculation education. There are three types of primary schools, each providing education in 3 different media of instruction respectively, namely Malay, Chinese and Tamil (Indian). Children start school at the age of 6, and most choose schooling in their own mother tongue at the primary level. The majority of the primary school pupils continue their education at government secondary schools where the medium of instruction is Malay.

The first 9 years of education is free and compulsory. Pupils progress across the grade levels by automatic promotion. Science is taught as one common subject in primary and lower secondary levels. Based on the pupils' performance on the PMR (Lower Secondary Assessment) examination taken at the end of lower secondary school years, the classes are streamed into science, technical and non-science (arts) tracks at the upper secondary levels. Science is taught as separate subjects (biology, chemistry and physics) to pupils in both science and technical tracks. Pupils in the non-science track continue to take science as one common subject. In addition, a small proportion (those in the commerce track) may take Additional Science or select one or two of the separate science subjects. At the pre-university or matriculation levels, only pupils in the science track are offered the 3 separate science subjects (or 4 when biology is split into zoology and botany).

The class size of Malaysian primary and lower secondary schools is fairly large, averaging between 35-40. Although there is generally no streaming or grouping of pupils according to ability or gender, some elitist schools group the pupils according to ability. Due to historical reasons, there exist a number of single gender schools for boys or girls. There are also a few special schools for blind, deaf or other handicapped children though pupils with special learning needs are in the process of being integrated into ordinary public schools.

### **3. Translation**

The finalized English version of the ROSE questionnaire (October 2002) was translated into the Malaysian language by graduate assistant and checked by ROSE team

researchers for clarity and linguistic equivalents. There were, however, some new science and technical terms or wordings that were retained in the translated text. Moreover, since a substantial number of Malaysian students are bilingual and proficient in English, a bilingual version of ROSE questionnaire in Malay and English was developed.

#### **4. National questions**

- additional questions for background of the home (parents education or occupation, etc.)
- additional survey questions

No additional item other than those in the finalized English version of the ROSE questionnaire was added. However, we were able to identify additional background variables, such as demographic region, types of school (rural-urban) , tracks (science or non-science) and ethnicity of pupils based on the way that the questionnaire were administered and organized. We have also developed a Test of Reasoning Skills in Science and administered it to the students from the science track only. These additional data are to be used in the national report.

#### **5. Official permission**

The Malaysian Ministry of Education requires researcher to obtain formal and official permissions to enter the schools to conduct research. We wrote to the Educational Planning and Research Division and 6 State Education departments to seek permission to conduct the ROSE surveys in the selected schools. A description of the ROSE project and the questionnaire was also attached. Upon granted permission from the Ministry and the respective State Education departments, we finally wrote to the principals to seek permission to conduct the survey in all the selected schools.

#### **6. Population**

The ROSE target population is the cohort of all 15-year-old pupils in the nation, or the grade level where most 15-year old pupils are likely to go. In Malaysia, this corresponds to the last year pupils attend lower secondary school (grade 8). However, this cohort of pupils are **not** accessible to researchers as they will be sitting for a public examination, PMR (Lower Secondary Examination), since the Ministry of Education will deny researcher permission to use conduct research on them. However, most of the students will be promoted to grade 9, the first year of upper secondary school.

For this reason, the Malaysian ROSE target population has to be altered to the cohort of pupils (16 year old) that has just been entered grade 9 (Note: Malaysia school year begins on 3 January) and the survey will be conducted at the early part of the school year. One notable difference between the grade 8 and grade 9 populations is that grade 8 students are not streamed but grade 9 students are streamed into science, technical and non-science (arts) tracks based on their Lower Secondary Examination performances in science and mathematics.

As ROSE samples school classes and not individual pupils, the Malaysia accessible population was more precisely defined as the pupils at the early stage of grade 9 (where most 16-year old pupils were likely to go).

#### **7. Sample and participation**

A list of all Malaysian secondary schools and their relevant statistics for 2003 was obtained from the Ministry of Education. The sample for this study was drawn from this

list using a stratified sampling routine. The first sampling unit is the school. Once the schools are selected, the grade 9 classes in these schools were the targets of a second random sampling routine. The schoolteacher who has been appointed as the research assistant in the school secondary carried out the random sampling routine. Once the classes are chosen, the students in these classes form the sample of this study.

The database contained in total 1.125 schools with 55.163 pupils at grade 10. The smallest schools had only one pupil at grade 10, while the largest school had 182.

Because of budget limitation, the research team adopted a stratified sampling strategy based on geographical region: West Malaysia (North Malaya, Central Malaya, East Coast) and East Malaysia (Sabah and Sarawak). We listed the North Malayan schools by states (Kedah and Penang) and school type (rural-urban). Using a computer random generator, one urban school and one rural school were each drawn from each state. Using similar school listings for other regions and the random procedure, 2 rural schools were chosen from Trengganu state (East Coast), 2 urban schools from Kuala Lumpur (Central Malaya), and one urban school and one rural school each from Sabah and Sarawak (East Malaysia). The resulting sample of 12 schools is expected to possess the essential national characteristics.

In January 2004, letters were sent to the 12 sampled schools inviting them to participate in the ROSE survey. A descriptions of the ROSE project together with copies of the permission letter from the Ministry of Education and the respective State Education departments were attached. The school principals were asked to enclose statistics on the number of grade 9 classes by stream (track) and the number students in each class for further sampling purpose. All the schools agreed to participate in the survey. For practical purposes, we left the sampling of the classes to the teacher research assistant in the school. The number of grade 9 classes varies across these 12 schools, ranging from 3 to 7. Specific instruction was given to the research assistant to select a number of classes for the survey: administer the questionnaire to all the classes for school with 4 grade 9 classes or less, otherwise randomly select a sample of 5 classes for administration but make sure that both science and non-science tracks are included in the sample.

There may be weakness in our sampling due to factors beyond our control, but we believe that given the budget limitations, our research sample is representative of the Malaysian target population.

## **8. Data collection in schools**

At each school, the school principal appointed a science teacher as the research assistant to conduct the ROSE project survey. The ROSE Project team paid the research assistant an honorarium for his or her effort. We distributed the questionnaires to the research assistant for administration in mid-June 2004. Also enclosed were pre-paid and addressed envelopes for the return of the questionnaires to the School of Educational Studies, Universiti Sains Malaysia. A letter with specific instructions for conducting the survey was attached. The teacher research assistant was advised to use two teaching periods (1 hour 10 minutes, preferably a science lesson) to administer the questionnaire, since the time limit would be more than sufficient for the students completing the questionnaire. At the beginning of the administration, the research assistant was asked explained to the student that the ROSE questionnaire is also administered to their peers in over 20 countries around the world, while emphasizing voluntarily participation and survey anonymity.

By August 2004, all 12 schools had conducted the survey and returned the questionnaires.

## **9. Feedback and experiences**

The Projecting visited the research assistants in 3 participating schools in North Malaysia to solicit their reactions and experiences in administering the survey, specifically about the data collection in the classes. Generally, the feedbacks are positive, and their pupils found the questions interesting, especially after being informed that they are participating in an international study. The major complain was that the questionnaire was somewhat too numerous and require long concentration hours.

## **10. Coding (also of the open-ended I question)**

The research assistant at the School of Educational Studies, Universiti Sains Malaysia, coded all the responses from the questionnaire directly as MS Excel files. The MS Excel files were read into SPSS program. In cases where major parts of the questionnaire were not satisfactorily filled in, they were excluded. The number of excluded cases was very small. In October 2004, the Malaysian SPSS file was finalized with 1544 respondents, with 735 girls (48%) and 809 boys (52%). The coding of the open-ended questions were done later, and in a separate file, based on the file provided by ROSE on the home page.

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